Load Building and Merchandising Number

Electrical West

With which is consolidated the Journal of Electricity

Graw-Hill Publication | October 1, 1927 | Twenty-five Cents Per Copy

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Department of Agriculture

Exclusive Features That Increase Sales

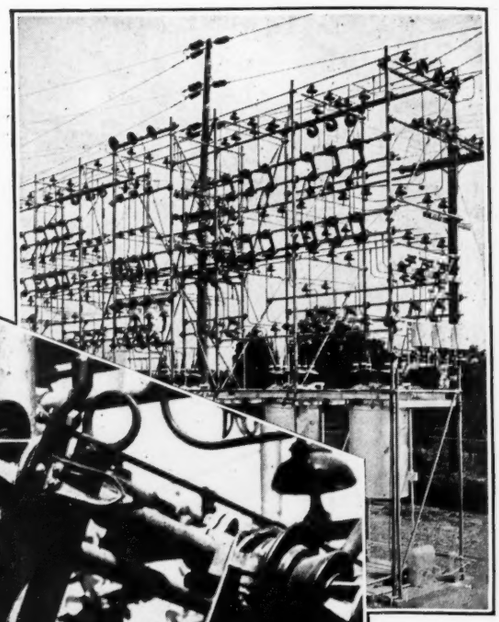
Porcelain Enamel Tub
No Pumps ~ No Stuffing Boxes
Dryer Chamber Instead of Wringer
Write or Wire for Details Relative to Franchise In Your Territory

ABC WASHER SHOP

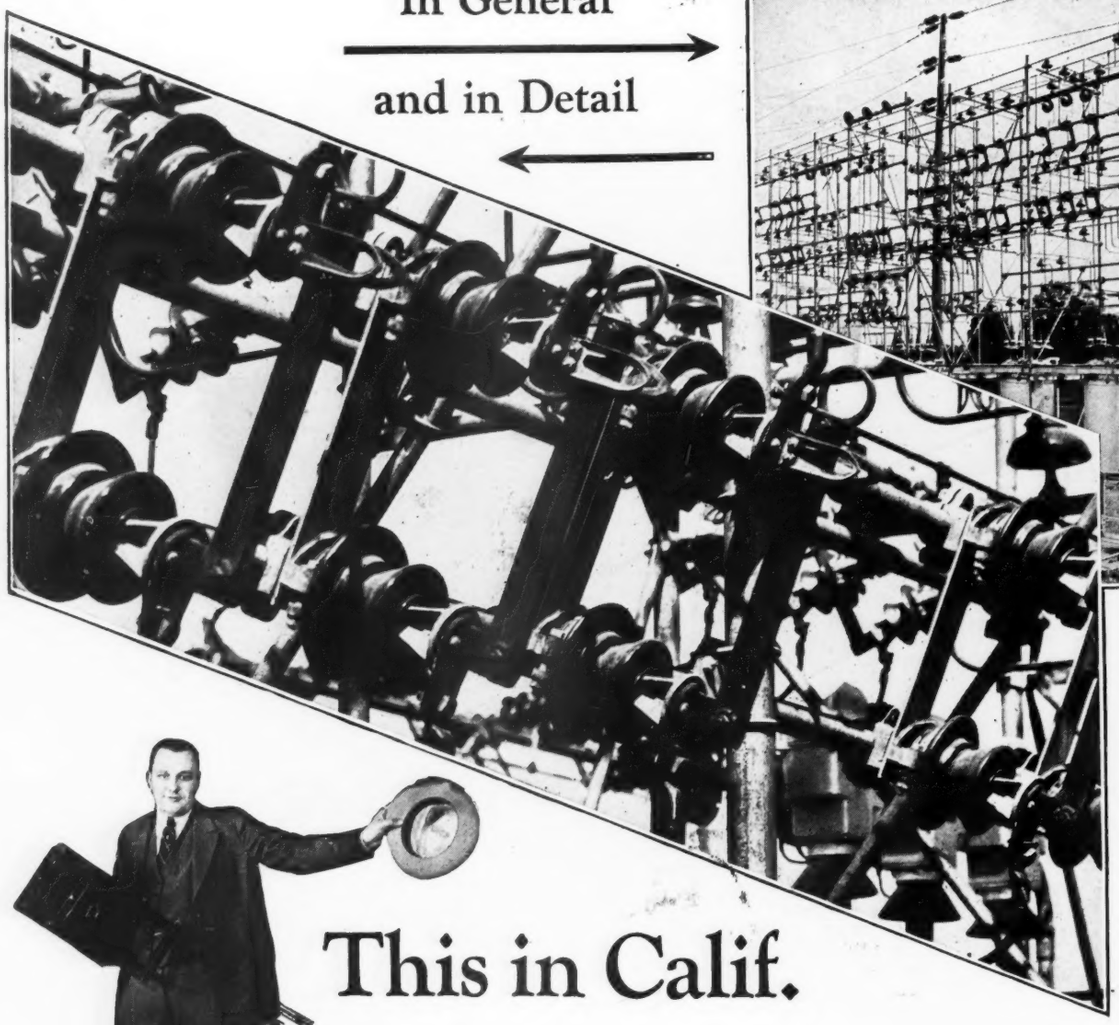
DOMESTIC APPLIANCE COMPANY, INC.
1535 San Pablo Avenue :: :: Oakland, Calif.
1160 South Hill Street :: :: Los Angeles, Calif.
Exclusive California Distributors

ABC WASHER SHOP

In General



and in Detail



This in Calif.

This pipe structure Switching Station, an interesting example of design providing for future growth, is equipped with Elpeco S. P. Disconnects insulated for 23,000 volts operating at 13,000 volts.

A transfer bus for connecting these two lines permits the inspection of either line switch.

This public utility company has several stations built of the same design, as experience shows the usefulness of present arrangement.

L. P. Co

ELPEC

ELECTRIC POWER EQUIPMENT CORPORATION

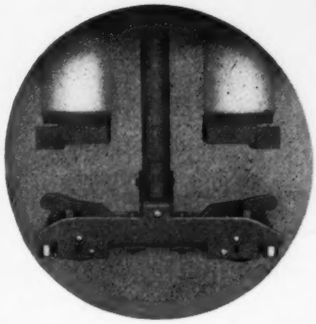
412-420 NORTH EIGHTEENTH ST. PHILADELPHIA, PA.

Western Representatives: C. E. INGALLS, Rialto Bldg., San Francisco, Calif.; EICHER & BRATT, 570 Colman Bldg., Seattle, Wash.

Electrical West entered as second class matter at the post office at San Francisco, under the Act of Congress, March 3, 1879. Published at 883 Mission Street, San Francisco, California, thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1. July 1, August 1, Septe mber 1, October 1, November 1 and December 1.

For Motor Starting Service

Type E-17



Showing laminated brush protected by heavy duty motor service arcing contacts.

The Condit Type E-17 is a special double throw oil circuit breaker having two outstanding advantages for motor starting service.

1. A reliable type of interlock with rugged face plates and handles.
2. Heavy duty contacts.

The same strong construction as used on Tandem arrangements for motor service.

Condit Motor Starting Circuit Breakers will stand the gaff!

SPECIFICATIONS: *300 amperes or less, 2500 volts. Estimated interrupting capacity, 2700 amperes at 2500 volts.*

CONDIT ELECTRICAL MFG. CORP.
Manufacturers of Electrical Protective Devices
BOSTON, MASS.
Represented by THE H. B. SQUIRES CO.
Seattle San Francisco Los Angeles

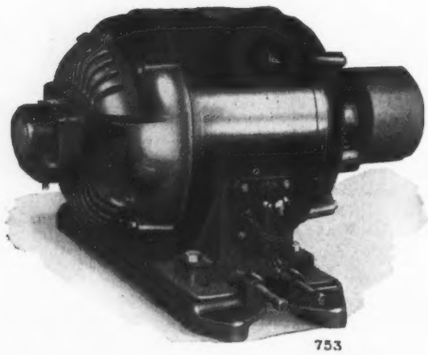
1283

CONDIT

Encyclopedia of Electric Refrigerators, Units and Cabinets
Encyclopedia of Oil Burners
Electrically Operated for Domestic Use
Encyclopedia of Vacuum Cleaners
Encyclopedia of Electric Clothes Washers
they all use MOTORS!

Every feature of Robbins & Myers motors means added years of service from their over-size bronze bearings to the "air-breathing" system of cooling.

They may be had in sizes up to 75 H.P.



753

Type "R A" Single-phase Repulsion-Induction Motor. Available in Ratings from ¼ to 7½ H. P.

Today the cry is loudest for motor-driven household appliances. Competition and higher safety standards demand that the motor—the very heart of the appliance—be of the highest quality.

Robbins & Myers have for many years been building motors with this in mind; as a result the keenest competition finds them more than holding their own. An R. & M. motor is the hall mark of a reliable appliance.

THE ROBBINS & MYERS COMPANY

Springfield, Ohio :: Brantford, Ontario

WEST COAST MOTOR DISTRIBUTORS

Stewart Electric Co., 2400 First Ave., South, Seattle, Wash.

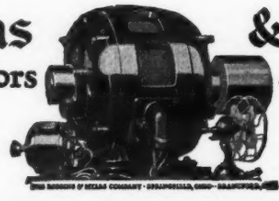
B. E. Davis Electric Co., 48 First St., Portland, Ore.

Walter G. Preddey, 187 Golden Gate Ave., San Francisco, Calif.

Hampton Electric & Manufacturing Co., 525 Howard St., San Francisco

T. L. Rosenberg Co., 419 Webster St., Oakland, Calif.

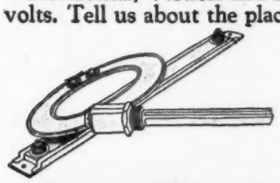
Robbins & Myers
Motors and Fans



Keep any part of *your* plant warm

Air compressor rooms	First Aid stations	Power houses	Sub-stations
Blower rooms	Garages	Pump houses	Valve houses
Crane cabs Elevators	Isolated shops and offices	Sand blast rooms	Warehouses
Drying rooms	Laboratories Lavatories	Scale rooms	Wash rooms
Electric locomotives	Milk storage rooms	Service garages	Watchman houses
Equipment repair shops	Oil and fuel storage rooms	Storage rooms	Welfare buildings

INSTALL these CHROMALOX ELECTRIC HEATERS and end complaints about "It's too cold to work out there"—end costly production delays because places are not properly heated. These fully assembled heaters are quickly mounted on the wall and connected to power lines. Each heater is equipped with a 3-heat switch for regulating temperature to suit weather conditions. 45 Sizes and Ratings. Three types —Horizontal, Vertical and Portable—1000, 1500, 2000, 3000 watts—110, 220, 250 volts. Tell us about the places you want heated—use the coupon!



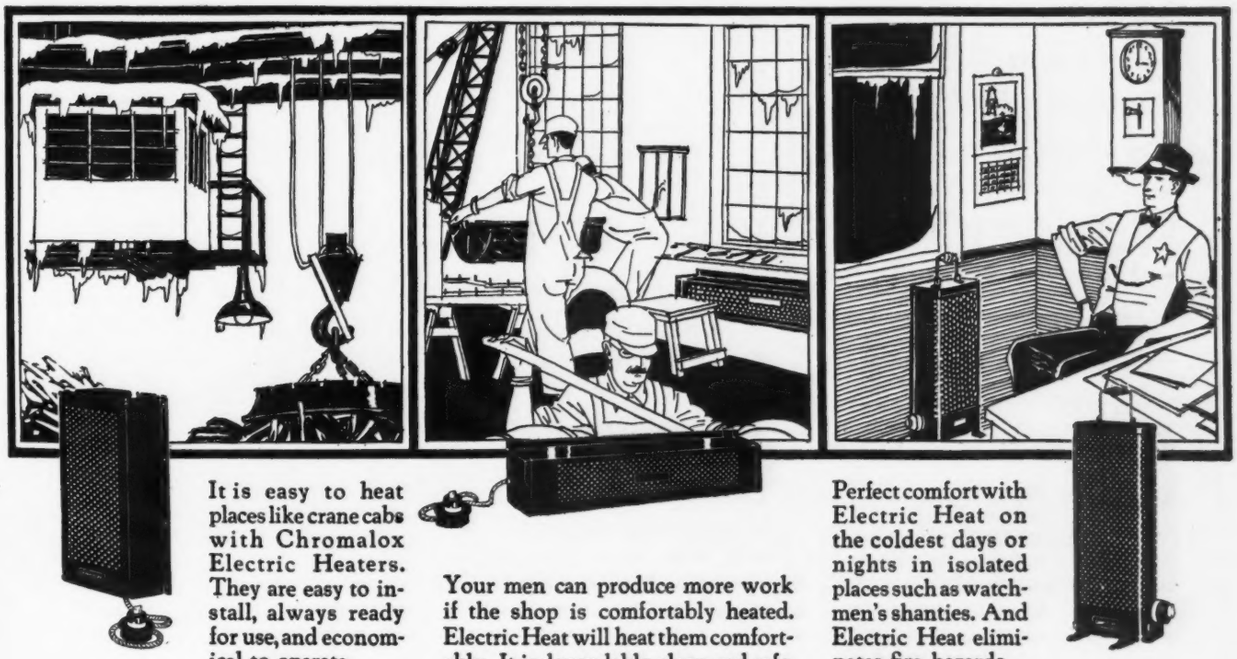
FOR HEATING FLUIDS AND SOLIDS

Certain of the 80 sizes of Strip Heaters, 8" to 72" long .... 11 diameters of Ring Units, 2½" to 11".... or 30 sizes of Immersion Units—all quickly shipped from stock—are sure to fit your applications. Write for Bulletin C-106. What is your job for Electric Heat?

CHROMALOX HEATING UNITS

MANUFACTURED EXCLUSIVELY BY

EDWIN L. WIEGAND CO., 422 FIRST AVENUE, PITTSBURGH, PA.



It is easy to heat places like crane cabs with Chromalox Electric Heaters. They are easy to install, always ready for use, and economical to operate.

Your men can produce more work if the shop is comfortably heated. Electric Heat will heat them comfortably. It is dependable, clean and safe.

Perfect comfort with Electric Heat on the coldest days or nights in isolated places such as watchmen's shanties. And Electric Heat eliminates fire hazards.

Mail with Your Letterhead

PLEASE send Bulletin C-108 about Chromalox Electric Heaters and tell us which type and size will properly heat a space_____ft. long _____ft. wide_____ft. high, having_____[number of] windows _____[number of] doors.

*Signed*_____ *Position*_____

CHROMALOX

Pacific Coast Representatives: ELECTRIC MATERIAL COMPANY, INC., 589 Howard St., San Francisco—443½ E. Third St., Los Angeles, California. HARRISON SALES COMPANY, 309 Lenora St., Seattle, Washington

MAJESTIC

developing New Markets for You!

OCTOBER is a red-letter month in Majestic history. It marks the inauguration of added prestige for Majestic Electric Appliances. We are making our debut in America's finest class magazine —*House & Garden*, and other national magazines —with hundreds of thousands of readers every month. Each reader is a logical prospect for several of the appliances in the Majestic line. This is a move of real significance. It reflects our policy of backing up our dealers with constructive advertising. It means that they get the benefit of a powerful sales-creating force.

SOME FACTS ABOUT MAJESTIC ELECTRIC HEAT
"you can't find anything handier, safer or cleaner"
SAYS THE ARCHITECT
"HERE is the newest and most efficient type of heating equipment These Majestic Electric Heaters are inserted right in the walls of the room. They give instant, diffused heat that is always available and can be automatically controlled by a Majestic thermostat."
"You have no fuel worries, no dirt or fuss, no smoke, odor or fumes, no discolored walls Electric heat is the safest and simplest. There is nothing that requires care or attention. The heat is there when you want it and off when you don t want it. With these Majestic heaters you can heat each room separately, without the waste of heating the entire house"
"Take your bathroom, for instance You'll need heat there practically every day in the year—when you won t want to go to the trouble and cost of firing up a furnace or an entire heating plant, just to warm the one room There is nothing like electric heat for quick efficiency and convenience These Majestic heaters require no expensive installation of ducts or ventilators"
"The same thing is true in other rooms—say, the breakfast room and bedrooms Even though you have a central heating plant, there ll be any number of times when you'll want independent or auxiliary heat *immediately* With Majestic Electric Heaters you have it—at the touch of a switch."
Write for complete information and list of recent important installations
The Majestic Electric
Bathroom Heater
Majestic Electric Heaters are artistically designed, are approved by the Underwriters' Laboratories, and are thoroughly practical.
They are so constructed, on a patented principle, that the air in the room passes thru the heater, thereby heating the entire room. There are no "hot spots" and no "frigid zones," but a diffused, even heat that keeps the room always comfortable at the desired temperature.
MAJESTIC
Electric Room and Water Heaters
MAJESTIC ELECTRIC APPLIANCE CO., Inc.
SAN FRANCISCO PHILADELPHIA
COMPLETE TANK WATER HEATERS
HIGH WATTAGE PORTABLE HEATERS
WALL INSERT HEATERS
BATHROOM HEATERS
REFLECTOR HEATERS
HOTCAKE AND WAFFLE IRONS
THERMOSTATS FOR ROOM HEATERS AND WATER HEATERS
CIRCULATION WATER HEATERS

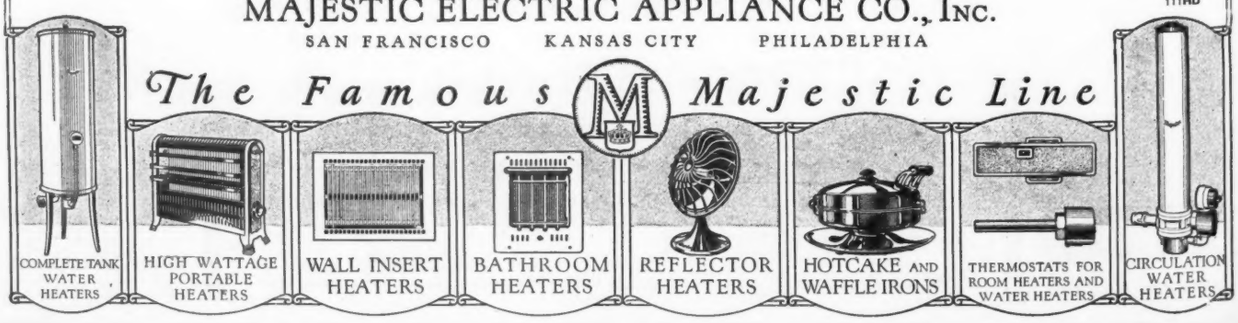
A reproduction of the full page advertisement in the October House and Garden

MAJESTIC ELECTRIC APPLIANCE CO., Inc.

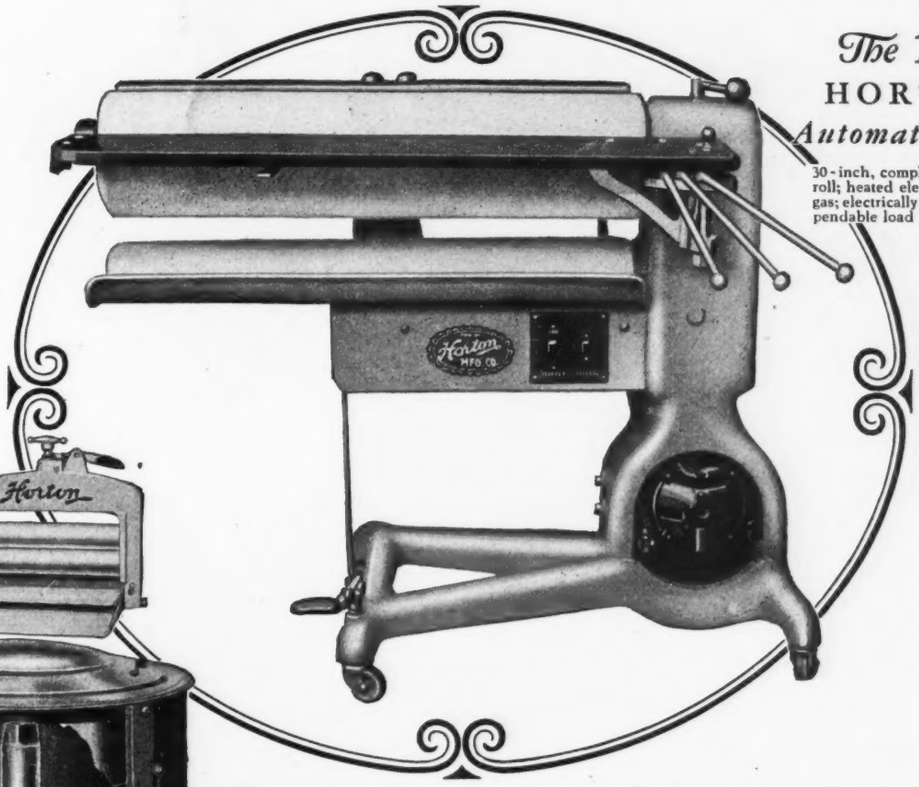
SAN FRANCISCO KANSAS CITY PHILADELPHIA

111HD

The Famous Majestic Line

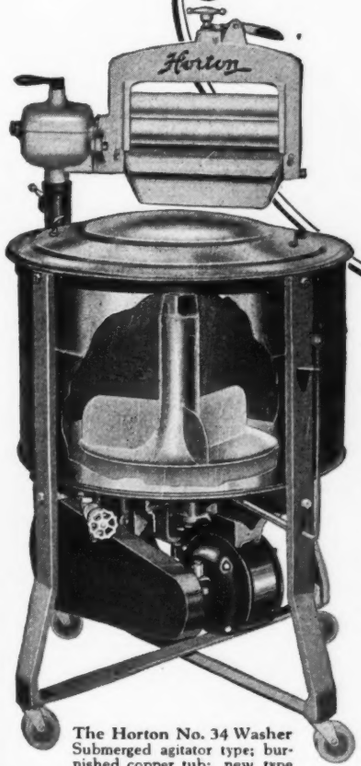


Building your Load— *and* Good Will



The New
HORTON
Automatic Ironer

30-inch, complete open-end roll; heated electrically or by gas; electrically driven. A dependable load builder.



The Horton No. 34 Washer
Submerged agitator type; burnished copper tub; new type wringer with semi-soft rolls; double-tilt drainboard. Remarkably quiet. A real good will builder.

ELECTRICITY becomes the servant of those who use the Horton Automatic Ironer. They find it economical, trouble-free. Soon you find them seeking other ways to put electricity to work for them—buying more and more appliances—thus building your residential load.

Those who buy Horton products—Ironers or Washers—use them and soon become friends—our friends and yours. By selling them products bearing the Horton name you assure them of dependable performance. You increase their confidence in other products which you merchandise. You build good will.

The present high quality standards of performance of Horton Washers and Ironers are the result of 57 successful years devoted to building home laundry appliances as near perfection as is humanly possible.

To merchandise managers who are interested in building profits, load and good will, the Horton story should prove highly interesting. May we send you details, and, in addition, a Horton Ironer or Washer for your careful inspection?

HORTON MANUFACTURING COMPANY
FORT WAYNE, INDIANA

HORTON *Washers Ironers*

GOOD PRODUCTS—Yes! *and above all else* GOOD FRIENDS

♪♪♪ This is the way we wash our clothes ♪♪♪

Another week's washing turned into a song. Another dull burden borne off by the Graybar Washer.

Other burdens; other Graybar burden bearers. In the home, household appliances. In the factory, motors. Taken altogether, the total involves some sixty thousand electrical items, all made available through a system of distribution that penetrates to the farthest corner of America.

Up and down the high roads of commerce and industry, through the chain of 61 Graybar-owned distributing houses, they come and go — these quality electrical supplies shipped under the Graybar tag to help wherever electricity makes merry with some age-old task.

Graybar Electric Co., Executive Offices: Graybar Building, Lexington Avenue and 43rd Street, New York City

THE jingle in the headline of this advertisement is playing a popular tune on the cash registers of Graybar dealers. The advertisement is one of a group of full-color insertions in the Saturday Evening Post. It appeared September 3rd.

One out of ten is empty
Hundreds of Central Stations
are gaining substantial increases in lighting revenue through the use of the Empty Socket Campaign, the new Fall sales activity on Edison MAZDA* Lamps.
Empty sockets constitute an unfilled market that is worth thousands of dollars annually. No new business is more easily obtained or more continuously profitable when secured.
The Empty Socket Campaign is one that has proved unusually successful. Moreover, it is adaptable to the present facilities of any electric service company.
This activity is but part of a sales promotion service that is enabling Central Stations to capitalize more fully the possibilities of the lighting market — the most profitable field for sales promotion.
Take advantage of this service. Whatever your lighting promotion problems, let us help you solve them. Just write to the Publicity Department, Edison Lamp Works of General Electric Company, Harrison, N. J.
*MAZDA — the mark of a research service
fill 'em up!

EDISON MAZDA LAMPS

GENERAL ELECTRIC

H & H

Switches

Plates

Switch-and-Receptacle in Hand-etched Art Plate

Install No. 8998 in

Breakfast Nooks — for lighting switch and toaster or percolator plug.

Kitchens — for lighting switch and iron or washing-machine plug.

Pantries — for light and electric refrigerator plug.

Halls — for light switch and cleaner plug.

Bath Rooms — for lights and electric heater plug.

Bed Rooms — for dressing-table lamp and electric curling iron or vibrator; or for lights and heating pad.

Porches — for porch light and washing-machine plug.

Offices—for overhead lights and dictating or multigraphing machine; desk fan or lamp.

Here, your customer sees a *double* convenience in controlling electric lights and a useful appliance. Glance through the list of uses at left.

The switch may be wired to control only the lighting, with the current in the receptacle always "ON." Or the switch may control the receptacle part only.

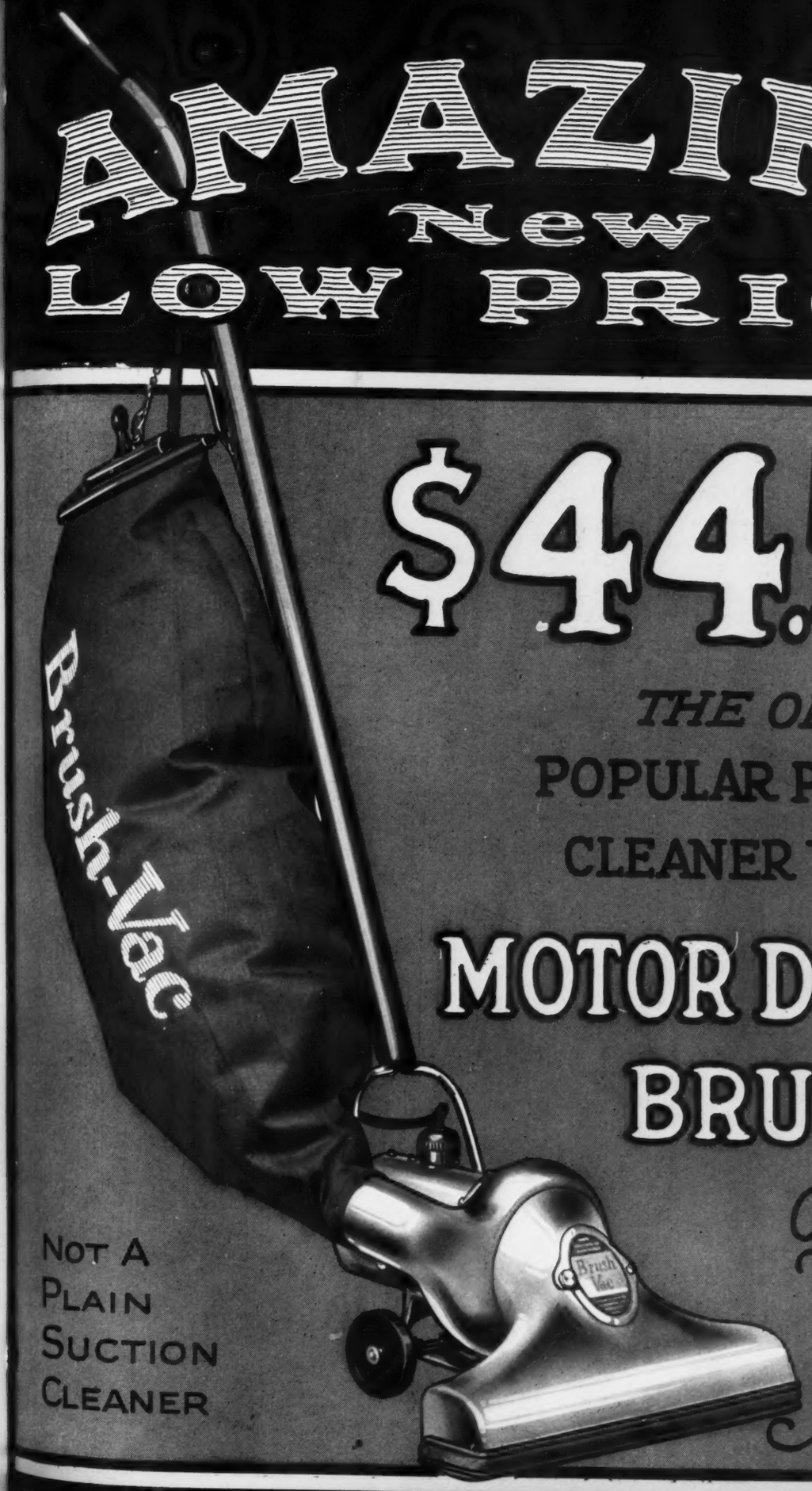
The owner gets a two-fold service through *one* wall plate — and a beautiful plate it is. The hand-etched Art Plate in Butlers Silver calls special notice to this accommodating new wiring device.

Glad to send you descriptive circular on the "8998" Combination, now available with H&H Art Plates in four handsome finishes.

THE HART & HEGEMAN MFG. CO.

HARTFORD, CONN. MAKERS OF ELECTRIC SWITCHES SINCE 1890

AMAZING
New
LOW PRICE



$44.50

THE ONLY

POPULAR PRICED

CLEANER WITH

MOTOR DRIVEN BRUSH

And You Make Money

NOT A PLAIN SUCTION CLEANER

GREAT SALES OPPORTUNITY

AT $44.50 THE BRUSH-VAC OPENS A VAST NEW MARKET

20 YEARS OF VACUUM CLEANER MANUFACTURE ARE BEHIND THE Brush-Vac

SPECIAL FEATURES

HIGH QUALITY THROUGHOUT
HANDSOME IN APPEARANCE
$44.50 RETAIL PRICE
HAS MOTOR-DRIVEN BRUSH
EXTREMELY HIGH SUCTION
WEIGHS ONLY 13 POUNDS
NO ADJUSTMENTS NEEDED
WONDERFUL ON SMALL RUGS
COMBS OUT RUG FRINGES
BAG DOES NOT TOUCH USER
GLIDES EASILY ON RUGS
BUMPER SAVES FURNITURE
DOMESTIC ELECTRIC MOTOR

Attachments $5 Retail

A TEN YEAR SERVICE PLEDGE GIVEN WITH EVERY Brush-Vac

You'll profit with the Brush-Vac

THOUSANDS HAVE WAITED FOR A CLEANER WITH MOTOR-DRIVEN BRUSH AT THIS PRICE

Never before has a MOTOR-DRIVEN BRUSH cleaner been retailed at such a price.

The Brush-Vac opens a new and positive sales opportunity.

Here is value beyond compare.

Highest quality throughout. Efficiency, construction, materials and design are absolutely of the best.

It's a beautiful cleaner, makes a wonderful demonstration and is ruggedly built for long life.

Sales possibilities are enormous. Lose no time! Fall and Christmas, two big buying seasons, urge you to immediate action.

Everywhere the Brush-Vac has been shown the trade has been loud in its praise of our liberal discounts and selling plan.

Get Yours Today! Write or wire for complete trade information; or, better still, order a Brush-Vac and cash in quickly on its popular appeal.

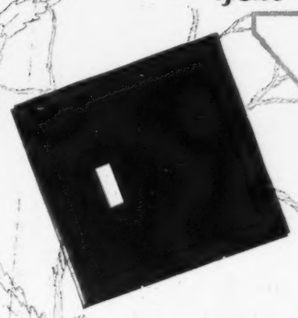
M.S. WRIGHT CO.

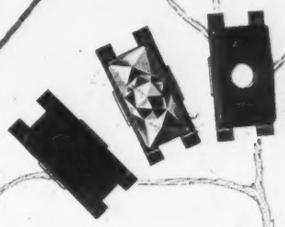
Since 1907 Makers of the Sweeper-Vac.

WORCESTER ~ ~ ~ ~ MASS.

Write NOW *for Information*

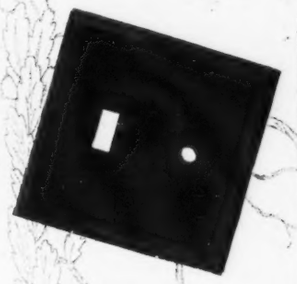
—it matters not what the need may be
—you can find it in the ACORN Tree.





ACORN SCREWLESS BAKELITE PLATES

"It's A Great Plate" — Ask Anyone



CONVERSION FEATURE

A Flexible Method Combining Convenience and Economy.

Another distinctive HUBBELL innovation in Cover-Plate construction.

NOW, a Blank, Telephone Outlet, or Jewel can replace the receptacle, just by snapping off the Screwless Cover-Plate and inserting the part desired. No screws to remove, no mechanical work, no substitution or loss.

The versatility of such a combination insures complete Plate harmony and provides for future contingencies. This flexible method alleviates many vexing problems of specification and planning.

Fill in the BLANK below for complete information on the Acorn Family. Write our nearest Branch Office-TODAY.

HARVEY HUBBELL INC
ELECTRICAL WIRING DEVICES
BRIDGEPORT CONN. U.S.A.

Write Your Nearest Branch Office

Atlanta, Georgia
138 Marietta St.
H. C. Biglin

Boston, Mass.
176 Federal St.

Pittsburgh, Pa.
State Theater Bldg.

San Francisco, Cal.
390 Fourth St.
Garnett Young & Co.

Chicago, Illinois
318 W. Washington St.

Denver, Colo.
1109 Broadway
The Sales Service Co.

New York City, N. Y.
30 E. 42nd St.

Philadelphia, Pa.
5th Avenue
Philadelphia Bourse
(Exhibition Dept.)

Send me complete information on the ACORN LINE

Name

Street

City

W-2-10-27. State

For Permanency And Beauty — Use
ACORN SCREWLESS PLATES

To Help You Sell

THE SATURDAY EVENING POST
Santa's Workshop—Making Gifts that keep on giving
THE SATURDAY EVENING POST
Gift Suggestions
EDISON ELECTRIC APPLIANCE CO., Inc.
SERVANTS
LADIES' HOME JOURNAL . . . December, 1927
GIFTS . . . . that Keep on Giving
GOOD HOUSEKEEPING . . . December, 1927
GIFTS . . . that Keep on Giving
Hotpoint SERVANTS

AGAIN, Hotpoint presents a complete merchandising and advertising plan to help you sell more Hotpoint Servants at Christmas. Dealers who carried out our complete plan last year did a great Christmas business. The powerful Hotpoint national advertising appearing in leading magazines during the buying season, when followed through with local merchandising effort, brings positive results. Decide now to get your share of Christmas Savings Funds money spent for gifts.

Hotpoint national advertising, continuous in leading magazines for over 20 years, has made Hotpoint Servants the easiest to sell. The Christmas advertising shown on this page is typical of the type and volume of Hotpoint advertising being carried in the magazines. Nearly seventy million Hotpoint advertising messages are read by the public each year. This advertising reaches every city, town and village where there is electrical service, and it goes into more than half the wired homes in your community.

GIFTS... *that keep on Giving*

The Hotpoint American Percolator

A beautiful table appointment of American craftsmanship. It makes coffee by the famous Hotpoint "Hot Drip" method which extracts the full aromatic flavor and fragrance. It is made of copper, lined with silver and finished in polished nickel.

Price $24.25

Other Hotpoint Percolators from $9.00 to $36.50

Dolly Madison Percolator Urn Set

Grace of design and beauty of finish are outstanding in this handsome percolator set. The urn is silver lined; the sugar and creamer gold lined. Its capacity is 8 cups of coffee made by the Hotpoint "Hot Drip" method.

Price $65—Satin Silver Finish

Price $55—Polished Nickel Finish

Other Percolator and Urn Sets as low as $14.25

De Luxe Waffle Iron

Bakes wonderful, golden-brown waffles without turning. No grease, no odor, no trouble. The Hotpoint Waffle Iron is equipped with the patented CALROD heating element which is more efficient and practically indestructible. Finished in highly-polished nickel.

Price $15.00

Other Hotpoint Waffle Irons at $10.50 and $11.50

Hotpoint Trianon Toaster

A Hotpoint Toast-Over Toaster will be appreciated every day in the year. The bread automatically turns when the toast is lowered. The toast is made just right—not too fast, scorching and burning the toast—not too slow, drying out the bread. Finished in highly-polished silver.

Price $6.00

Other Hotpoint Toast-Over Toasters at $6.00 and $8.00

De Luxe Traveling Iron

A beautiful 3-pound Hotpoint Iron with ivory enameled wood handle, gray silk cord and plug. Packed in an attractive gray leatherette case with removable tray for cord and plug, hinged top and snap fastener for case.

Price $6.95

De Luxe Curling Iron Set

The famous Hotpoint Curler with an ivory finish handle, in a silk-lined, gray leatherette case. An exclusive feature is the shield which opens parallel to the heated waver rod so that the hair is held evenly for the full length of the rod.

Price $7.50

Other Hotpoint Curlers as low as $2.50

Hotpoint Super-Iron

Only the Hotpoint Super-Iron has the patented CALROD heating element that is practically indestructible; the Thumb Rest that rests wrist, arm and shoulders; the Hinged Plug that trebles the life of the cord. The Hotpoint Super-Iron is hottest at the point where the iron meets the damp cloth first. An ideal gift of lasting satisfaction.

Price $6.00

Another 6-pound Iron at $5.00

Hotpoint Triplex Grill

The Hotpoint Triplex Grill poaches, toasts, broils, boils or fries—three operations at the same time. It will be appreciated by those who delight in the unusual for Sunday night or midnight supper. Ideal for the bachelor girl and others who do not have regular kitchen facilities. A most convenient electrical appliance because of its many uses. Complete with necessary utensils.

Price $13.50—Duplex Grill at $9.85

White Enameled Top Table Stove at $4.00

Hotpoint Servants are ideal gifts. They are useful and beautiful—lasting for many years to remind the ones who receive them of the givers. So urge your customers to give these "gifts that keep on giving," in preference to other articles that last a few days or weeks.

To help you capitalize on this tremendous Christmas advertising campaign, we have prepared Christmas appliance literature, newspaper advertising and window display material. This material is in keeping with the attractive national advertisements, having for its main theme Santa's Workshop. Send for complete information and samples.

Hotpoint SERVANTS

For Central Stations we have special literature for the N.E.L.A. Concurrent Advertising Campaigns. Write for it.

EDISON ELECTRIC APPLIANCE CO., Inc.
155 New Montgomery St., San Francisco, Calif.
Factories: Chicago, Illinois, and Ontario, California
Chicago New York Boston Atlanta Cleveland Dallas Salt Lake City Kansas City Seattle Portland Los Angeles San Francisco Ontario, Calif.
In Canada: Canadian General Electric Co., Ltd., Toronto

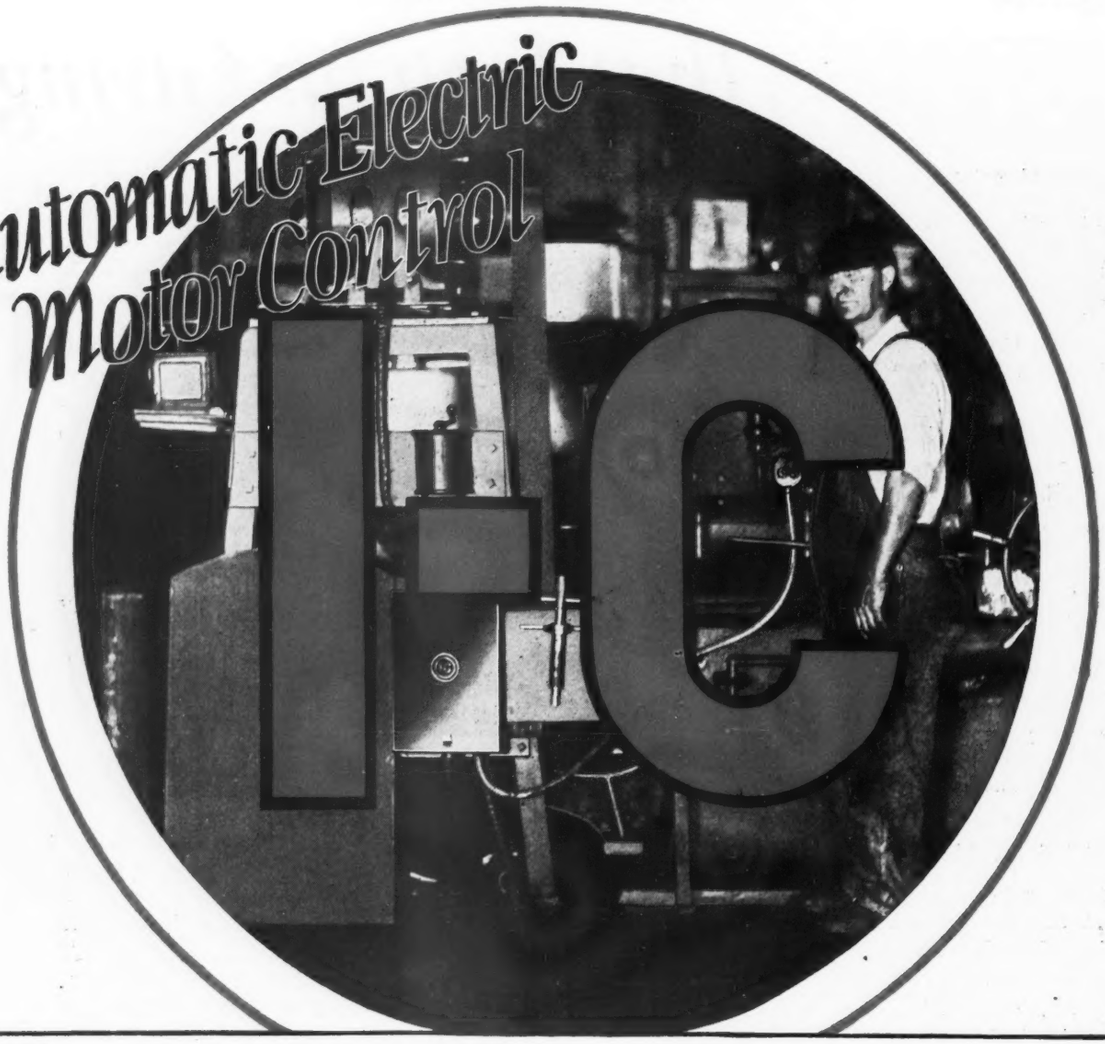
MAIL THE COUPON

EDISON ELECTRIC APPLIANCE CO., Inc.
155 New Montgomery St.,
San Francisco, Calif.

Please send full details of your Christmas Appliance Merchandising Plan.

Name.....

Address.....



As They Say At The Beckwith Company

Class 8527. Automatic A. C. Across-the-Line Starter with push-button control.

Write for Catalog

Mr. F. C. Huller, *Chief Electrician, The Beckwith Company, Dowagiac, Mich. says:*

"Our first Industrial Controller Automatic Starter was installed in 1923; now we have about 60 I-C starters and automatic compensators, classes 8527, 8526, 8605. These are used on individually driven machines in foundry, machine shop, assembly rooms, sheet-metal plant, pattern shop, etc., in the manufacture of our well-known line of Round Oak Stoves and Furnaces.

"Our object in installing automatic starting equipment was to conserve power, lower motor and machine repairs, end fuse replacements, and keep production going. As a direct result of using automatic starters and compensators, we rewound only half as many motors in 1926 as we did in 1923.

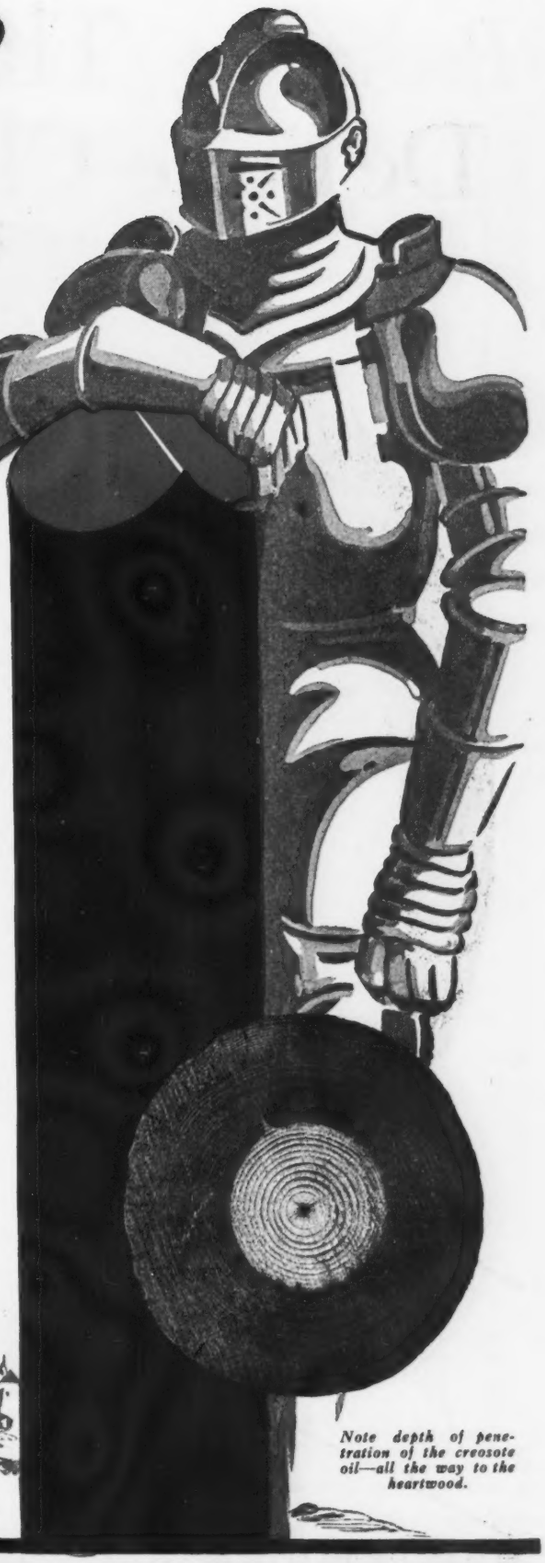
"In spite of frequent starting and stopping, our I-C Across-the-line Starters have stood up remarkably well and none of them has ever required repairs. In fact, the only maintenance given them is a weekly inspection. Automatic starters of another make have required considerable repairs and replacement of parts.

Industrial Controller Co.

MILWAUKEE. WIS. U.S.A.

Robinson Sales Co., Polson Bldg., Seattle; 53 Fourth St., Portland
San Francisco Office: C. E. Ingalls, Rialto Bldg.

A coat of armor for your POLES



Untreated poles offer little resistance to the deadly attack of fungus growths, termites, moisture, acid soils and other forces which promote decay, and result in loss of tensile strength. When wind and ice storms come, the weakened, untreated poles go down; and service interruptions and service costs run high.

On the other hand, "Black Beauty" Poles retain their great natural strength and defy wind and ice storms year after year—*because they are protected from the attack of destructive forces.* The injection of Standard Grade-1 creosote oil into the pores of the sapwood, under high pressure, forms around the heartwood a thick protective shield. This is a veritable coat of armor—which is toxic to decay-producing fungi and all forms of insect life, and highly resistant to moisture, acid soils and all of the forces which so quickly steal from the strength and service life of untreated poles.

"Black Beauty" Poles insure a lower cost per mile, per year than is possible with untreated poles of any species. Their first cost is the last cost for many a year to come. They are one of the best investments any company can make. Quotations promptly furnished.

Texas Creosoting Company

Main Office and Plant: Orange, Tex., U.S.A.

W. W. WILKINSON, Pacific Coast Rep.,
Insurance Exch. Bldg., Los Angeles, Calif.

Note depth of penetration of the creosote oil—all the way to the heartwood.

"BLACK BEAUTY" POLES

For easy identification, "Black Beauty" Poles are now trade-marked with a red roof.

Presenting . . The New Hotpoint De Luxe Christmas Range

special Christmas offer

HERE is the new Hotpoint Automatic Electric Range especially designed for the Christmas Campaign. It has practically all of the features of the famous Hotpoint De Luxe Range and sells at a lower price.

You'll agree when you see this range that it is the finest Hotpoint Range ever offered. You will find it easy to sell especially with the wonderful merchandising literature and display material we are furnishing and the aid which will be given by the national advertising.

The 1927 Christmas Range has many features that will aid in its sale. Some of these are: the Hotpoint Fireless-Type Cooker, automatic time and temperature controls, four-piece condiment set for sugar, pepper, etc., De Luxe kitchen clock, utility drawer, cooking surface light, smokeless broiler pan, Calrod oven unit, etc.

Hotpoint

ELECTRIC RANGES

and a Complete Selling Plan

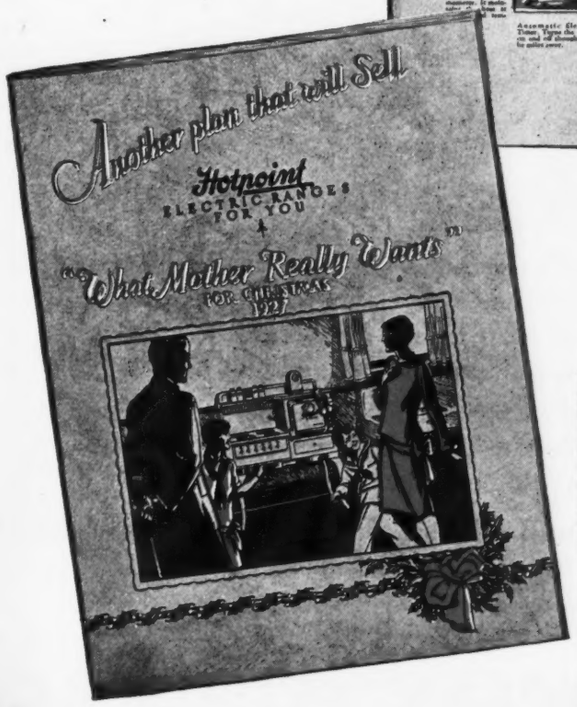
TO help you sell this wonderful range we have prepared the most beautiful color literature ever produced on ranges. These we will supply to you *free*, imprinted with your special offer, name and address, together with attractive window display material and newspaper advertisements.

Further, for the first time, we will back up the Christmas campaign with a full-page advertisement in color in The Saturday Evening Post and an advertisement in Good Housekeeping. We are going to make this the most successful Christmas range campaign you or Hotpoint has ever had.

Complete and detailed plans for selling this range are contained in the 1927 Christmas Range Plan Book illustrated below.

Send for your copy today.

THE SATURDAY EVENING POST
Here's what Mother really wants
This All-White Hotpoint Automatic Electric Range
Picture her delight on Christmas morning when she discovers this wonderful, modern range in her kitchen
A Gift that Keeps on Giving
Hotpoint
SERVANTS



This advertisement appearing in the November 12 Saturday Evening Post will aid your Christmas Range Campaign. Its heading is the slogan, "What Mother Really Wants," used in the beautiful full-color literature we will furnish you. A similar advertisement will appear in November Good Housekeeping.

MAIL THE COUPON

EDISON ELECTRIC APPLIANCE CO., INC.,
155 New Montgomery St., San Francisco, Calif.

Please send me a copy of the 1927 Christmas Range Selling Plan Book.

Name.....

Address.....

.....

The Haag Vortex
"The finest machine money can buy."
Also available with built-in 4-cycle gasoline motor.

The Haag Eighty
A high-grade all-metal washer built to sell at a low price.
Also available with built-in 4-cycle gasoline motor.

How About Service?

THERE is no better indication of the *quality* of a line of washing machines than the number of service calls the dealer is called upon to make on machines he has sold.

Frequent service calls are proof that something is wrong — something in design, material or workmanship.

Haag Brothers Company is justly proud of reports which continually come in from Haag dealers stating that they seldom, if ever, have to service a Haag washer. It is our honest belief that no other line of electric and power washers requires so few service adjustments per thousand sold.

That is one reason why Haag dealers' sales are *clean* sales—with clean profits. We cordially invite you to inquire of *any* Haag dealer what his experience has been.

And we invite you to find out first-hand how profitable a Haag dealer franchise will be for you. Wire or write for full details today.

Haag Brothers Company, Peoria, Ill. For 16 years makers of a complete line of quality washers.

HAAG BROTHERS COMPANY, PEORIA, ILL.

COMPLETE UNITS NO LOST PARTS

The covers and wiring devices are complete units; therefore, no parts can be lost during installation.

The New Obround CONDULET

The Latest and Greatest Condulet Development

For other Distinctive and Novel features and listings of the New Obround Condulets, see Catalog No. 2100.

CROUSE-HINDS COMPANY

ESTABLISHED 1897

SYRACUSE, N. Y., U. S. A.

Sales Offices

PHILADELPHIA PITTSBURGH NEW YORK DETROIT CINCINNATI CLEVELAND ATLANTA BOSTON CHICAGO ST. LOUIS SAN FRANCISCO MINNEAPOLIS MILWAUKEE

CH 279

Cash in on refixturing with these unusual units

Aristolite employs the semi-indirect principle of illumination, which assures the most satisfactory light for the home. The fixture is equippea with a convenience outlet in the center of the bottom of the fixture. This permits the use of such appliances as percolators, toasters, and other devices. Switch in base of fixture controls lights when not needed.

PATENTED

Ease-I-Lite is a beautiful new unit, designed to produce a soft, mellow light, with complete absence of shadows. This is accomplished without sacrificing the decorative beauty that is desired in the home.

A built-in convenience outlet is hidden from view, when not in use, by an ornamental pendant.

PATENTED

Shaded, semi-indirect light is the ideal light for home or commercial illumination

The New Brascolite
PAT'S. PENDING

All of the activities of the industry are focused on replacing obsolete and glaring lighting equipment with modern shaded light.

All Guth units offered for refixturing are designed to meet the specific needs of such an activity. Home Lighting units are designed to use the new standard lamps of sufficient wattage to assure adequate illumination. Lamps are shaded to eliminate glare. The fixtures have convenience outlets built in and hidden by ornamental pendants.

The New Brascolite and the GuthLite create new opportunities for commercial lighting.

The reflecting surface is so constructed that the light rays are broken up and diffused over a wide area; this eliminates shadows on the working plane. Specially designed glass eliminates glare at the source.

If you are not familiar with the Guth refixturing plan write for full details. Those who have seen it pronounce it the most comprehensive campaign ever offered the industry.

The GuthLite
PAT'D. & PATS. PEND.

Convenience outlets built in the fixtures permit use of appliances without necessity and bother of removing a lamp from socket.

THE EDWIN F. GUTH COMPANY
2611 Washington Ave., St. Louis, Mo.
Designers, Engineers and Manufacturers of Lighting Equipment Since 1902
A National Organization with Representatives in all Principal Centers

Over twenty-one hundred Bryant switches, three thousand Bryant flush receptacles and "Spartan" Caps, over five thousand gangs of flush plates, and other Bryant wiring devices are installed in the Russ Building, San Francisco, California.

THE BRYANT ELECTRIC COMPANY

149 NEW MONTGOMERY STREET SAN FRANCISCO, CALIF.

New York Philadelphia **BRIDGEPORT, CONNECTICUT** Chicago San Francisco

Manufacturers of "SUPERIOR WIRING DEVICES" SINCE 1888

Why Be Satisfied

The Home Lighting Pie

ALTHOUGH using but 29% of the energy produced, lighting yields the central station 63¼% of its entire revenue. Thus during 1926 the home owners of this country paid you $343,000,000 for lighting current. But in the 16,000,000 wired homes of this country there are 45,000,000 entirely obsolete ceiling fixtures, and conservative figures of a nation-wide survey show that the average American home which is now yielding a gross revenue of $27.90 a year, would, if properly lighted, spend approximately $50 a year for current. Fifty dollars a year for all of the comforts that good light brings is nothing. But fifty dollars per year per home would multiply the central station's present net profit of $2.10 per home by about six. Figure it out on paper and you'll go out and do it on your lines.

With A Plum?

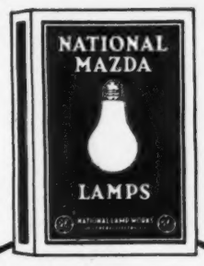
"Put in his thumb and pulled out a plum,
And said what a good boy am I".

HOME lighting is a plum which central stations have cherished for a long, long time. It has grown to be a fat juicy plum—the greatest source of revenue, the greatest source of profit you have.

But now the plum is ripe—most of the homes are wired. And now you'll discover that the plum you cherish is only part of a great tempting pie.

When the pie is opened—when the homes you have wired are really lighted—when the obsolete and antiquated fixtures are replaced by modern lighting equipment, then your greatest source of revenue, and your greatest source of profit will be double what it is today.

Why be satisfied with a plum wnen the whole pie is waiting for you?



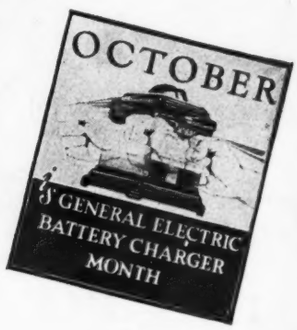
The nation-wide re-lighting and re-fixturing campaign offers the central stations of America the greatest load-building opportunity in their history. At Nela Park, Cleveland, the worlds greatest lighting experts are at your call to help you quickly make the most of this opportunity. Call on them.

The NEW *National*
A GENERAL ELECTRIC *PRODUCT*

MAZDA LAMPS

"MAZDA" is not the name of a product but the trade-mark of a Research Service, and only those lamp manufacturers entitled to receive this service may distinguish their lamps with the mark, MAZDA.

No more cutting prices



G-E Wiring System advertising is teaching the public to demand electrical comfort—is aiding the architect in specifying adequate wiring and is showing builders and realtors the advantages of featuring wiring in the sale of a home.

GENERAL

MERCHANDISE DEPARTMENT

to land the job

The nationally advertised G-E Wiring System wins against skimped-bid competition

Three years ago, the G-E Wiring System was an idea. Today, it is the contractor's biggest profit-maker.

People are no longer satisfied merely by a low price on a wiring bid. Instead, your prospective customer looks for better wiring—for quality—for completeness of detail. And he is willing to pay a fair price for those things. General Electric's consistent advertising has brought the change. And now the contractor who bids on the nationally known G-E Wiring System gets bigger jobs—and a fair profit—against skimped-bid competition!

G-E WIRING SYSTEM

—for lifetime service

GENERAL ELECTRIC

BRIDGEPORT, CONNECTICUT

Two Major Campaigns

During October and the first half of November the Southern California Edison Company will conduct two major merchandising campaigns simultaneously.

WAFFLE IRONS

A small-appliance campaign on the Edison Electric Waffle Iron will start on October 1st. A quarter of a million envelope stuffers carrying the appetite appeal of golden-brown waffles will be mailed to consumers.

RANGES

The heavy-appliance campaign will feature the Hotpoint Electric Range. Newspaper advertising in 160 papers will be backed by 120,000 mailing pieces sent out to a selected list of Edison consumers—a total of more than four and one-half million messages creating the desire to own an electric range.

DEALER HOOK-UP

As has been done in past campaigns, the electrical dealers in Edison districts are invited to co-operate. The dealer is prominently featured in all newspaper and direct mail advertsing.

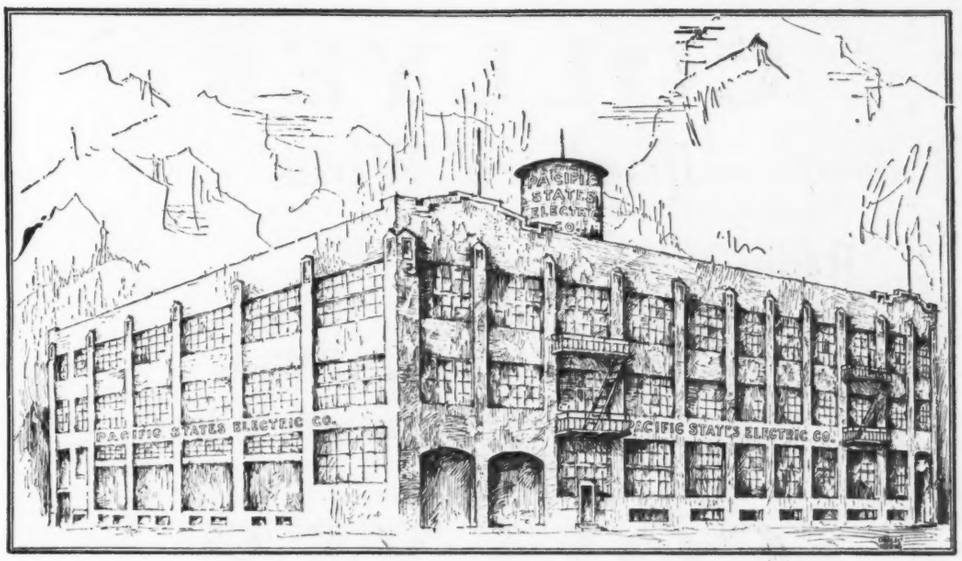
1000 WIRING JOBS

Each range sold creates a wiring job for the electrical dealer or contractor. More than one thousand of these should be the result of this campaign.

SOUTHERN CALIFORNIA EDISON COMPANY

Owned by those it serves

We've Moved!



October 10th finds us in our new building—1201 Bryant Street at Tenth — better equipped than ever before to serve our patrons . . . Central location — easily accessible — ample private parking space for our patrons.

SAN FRANCISCO OFFICES & WAREHOUSE

now at

10th *and* BRYANT

SAN FRANCISCO

PACIFIC STATES ELECTRIC COMPANY

MERCHANDISE DISTRIBUTOR

Los Angeles San Diego San Francisco Long Beach Portland Phoenix Spokane Oakland Seattle Tacoma

4827

Far-Western ALLIN *Distributors for*

25 YEARS SERVICE ON THE WEST COAST

COLLYER

Insulated Wires

Radio Wires
Armored Cables
Rubber Covered Wires
Weather Proof Wires

COLLYER

Cords

Silk
Cotton
Lamp
Fixture
Reinforced
Rubber Covered

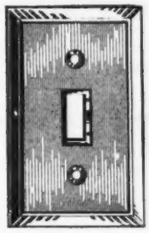
Extensive Stocks at All Points

COLLYER
INSULATED WIRE COMPANY
Pawtucket, R. I.

ALLIED INDUSTRIES, INC.

San Francisco Los Angeles Oakland Portland Seattle

Nationally ALIN *Known Products*



The new Hemco Bakelite Wall Plates are being installed in hotels, apartments, office buildings and homes everywhere. Their attractive finish and lasting beauty have quickly brought them into favor.

GEORGE RICHARDS & CO., INC.
557 West Monroe St., Chicago

Steel City Wiring Devices Give the Perfect Installation

Electrical contractors everywhere have recognized the fact that Steel City Wiring Devices assure perfect installations.

To get more orders and larger profits you should learn more about the Steel City line.

Steel City Electric Co.
PITTSBURGH PENNSYLVANIA

Buckeye Conduit Has No Superior

From start to finish Buckeye Conduit is manufactured with the utmost uniform care. The ease with which it is handled and installed saves time and money on any job, large or small.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Youngstown, Ohio

Safety Switches

For Every Service

The increasing number of complete T-V installations for power, light and heat loads offer ample proof that these switches give service and satisfaction under all operating conditions.

TRUMBULL-VANDERPOEL ELECTRIC MFG. CO.
Bantam, Conn.

ALLIED INDUSTRIES, INC.

San Francisco Los Angeles Oakland Portland Seattle

The "Why" of KONDU Threadless Fittings

No threading.

No threading machines, die stocks or dies.

Less tools required to install the conduit.

No oil needed.

Wall of conduit not weakened by cutting of threads.

No exposed threads on the conduit.

Spotting time and trouble considerably reduced.

Easily installed in cramped quarters.

No screwing of conduit into fittings.

No loss of time in starting damaged threads.

No rotating of conduit.

Bent conduit fitted as easily as straight.

All short pieces of conduit can be used.

Impossible installations with threaded fittings made possible with KONDU.

Conduit can be permanently fastened before installing fittings.

Every Kondu Box a union itself.

Maximum accessibility to interior of box.

Unbreakable—Made of certified malleable iron.

Big salvage value. Fittings can be returned to stock when taken out of line.

High rust and corrosion resisting qualities.

Great strength and rigidity.

Continuous grounding without scraping the enamel from conduit.

Vibration proof.

Inside bead on bushing prevents tearing of insulation.

Neat—Compact.

Space savers.

No excessive fittings necessary.

Easily aligned.

Simple in design.

Can be exactly spaced.

Can be spaced exceedingly close.

Tightening locknut adjusts box to any angle and stays put when so placed.

Can't be beat for temporary work.

KONDU boxes give a neat appearance to the finished job.

Cover screws cannot fall out.

Screw holes in box so placed as to eliminate contact with insulation.

Fibre cushion under screw head prevents breaking of porcelain.

Best quality finishes of galvanize and black enamel on fittings.

A type for every need. Special threadless types for knockout boxes, 90° bends, fibre to iron connections, couplings, etc.

Made waterproof with ease.

Simplicity of the entire line. No reducing boxes necessary—Use the KONDU Reducer.

MONEY SAVING. LABOR SAVING. TIME SAVING.

ERIE MALLEABLE IRON COMPANY

KONDU DIVISION, ERIE, PENNA.

Representatives:

J. G. POMEROY CO., Los Angeles, San Francisco, Seattle FRED E. STAIBLE, Denver, Salt Lake City

A. C. *and* D. C. *controllers* . . .

MONITOR makes them all . . .

WE ARE PIONEERS in Alternating Current control design just as we are in Direct Current control design.

There are no control features of alternating-current motors, speed, reversing, starting, stopping, running slow or fast, protective and safety features, that cannot be met by a controller designed by Monitor Engineers and built of Standard Monitor units.

MONITOR CONTROLLER COMPANY
Baltimore, Maryland
THE ELECTRIC MATERIAL CO., INC., San Francisco, Calif.

6534-1

IF YOU HAVE A CONTROL PROBLEM . . . CONSULT MONITOR

MONITOR *does it automatically*

Improved!

PARAFFIN FINISH

DURAWIRE

Reg. U. S. Pat. Off.

Order Durabilt Products by name From Your Jobber

DURAWIRE
Rubber-Covered Wire and Flexible Cords

DURAFLEX
The Safe Armored Cable and Flexible Steel Conduit

DURACORD
The heavy-duty Portable Cord

DURADUCT
The fast-fishing Single-Wall Loom

DURAX
The Non-Metallic Sheathed Cable of Known Quality

A Cleaner, Smoother, and more Flexible wire than any you ever used. The surface won't soil your hands.

No sticking or jamming — just a quick, smooth-sailing wiring job that protects your profits. DURAWIRE was always good — now it's better than ever.

Yes! *it's one of the Durabilt Products*

DURABILT PRODUCTS

REG. U.S. PAT. OFF.

C. DENT SLAUGHTER

Pacific Coast Representative

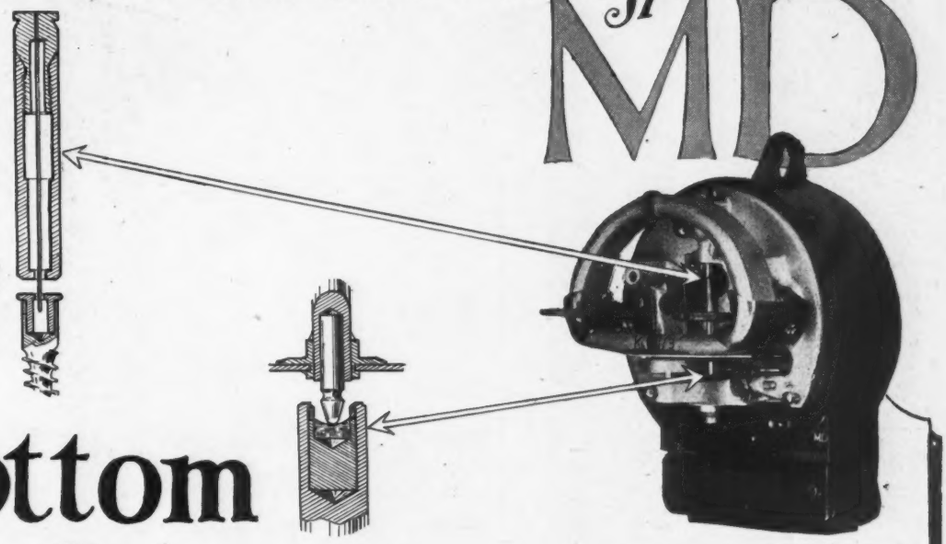
314 12th Street, San Francisco
324 N. San Pedro Street, Los Angeles
200 North 13th Street, Portland
1108 Post Street, Seattle

Stocks carried at all coast jobbing centers

the new Duncan Watthour Meter, type

MD

Top and Bottom



Bearing Design of Time-Proven Excellence

To minimize friction, and to avoid complications that entail excessive maintenance, were two important objects attained in the bearing design of the Duncan Type MD Watthour Meter. The extremely low center of gravity of the moving element and its prefect balance leave a very small amount of work for the top bearing. Yet it is carefully worked out in every detail, and years of experience on the Model M2 have proven its excellence. A long steel wire secured at the upper end and enclosed in a tubular housing, with a slight clearance at the bottom, forms the stationary element. A polished brass ring bearing is set in the upper end of the spindle, and forms a practically frictionless bearing. In fact, oiling is not recommended.

The lower bearing consists of a hardened and ground pivot of steel, with a highly polished, hemispherical surface, resting on a cup jewel mounted in a removable jewel post. The ratio of bearing surface to weight is the result of exhaustive tests, verified by the performance of thousands of meters in use at the present time.

"Holding Fast *to that which is Good*"

While the type MD meter represents a departure in certain features from the previous type, the Model M2, experience with that meter over a period of years has demonstrated the excellence of many of its fundamental elements as well as various details. In the present series of advertisements we are calling attention to those elements of proven worth which time and experience have indicated should be retained in the type MD.

DUNCAN ELECTRIC MANUFACTURING COMPANY, LAFAYETTE, INDIANA

A. F. BLECKSMITH,
547 Douglas Bldg.,
Los Angeles

DUNCAN
Watthour Meters

GEORGE L. HOFFMAN,
202 Oregon Bldg.,
Portland

Trouble-free

All the mechanism of the General Electric Refrigerator is enclosed in one hermetically sealed casing which is mounted on top of the cabinet. There isn't an exposed moving part—no belts, fans, pipes or stuffing boxes. It *never* needs oiling. It is unusually quiet.

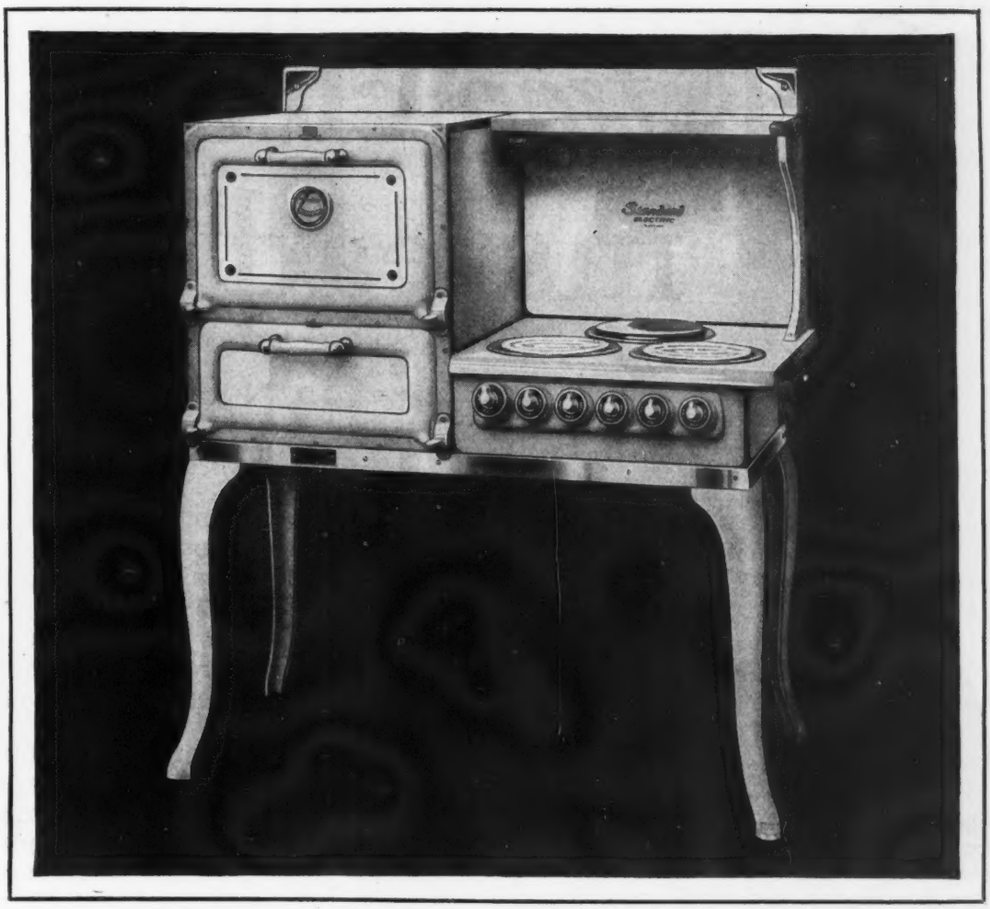
Because of these trouble-eliminating features, the General Electric Refrigerator dealer is able to devote all his time to sales.

The reliability and simplicity of the General Electric Refrigerators—and the faith the public has in the company which manufactures and guarantees them—combine to make our dealer franchises most attractive.

We have open territory and are seeking thoroughly reliable and progressive merchants for these franchises. Get in touch with us now for further information.

GENERAL ELECTRIC Refrigerator

ELECTRIC REFRIGERATION DEPARTMENT · OF GENERAL ELECTRIC COMPANY · HANNA BUILDING · CLEVELAND, OHIO



The Standard Electric Water Heater

offers added sales opportunities. Thoroughly tested and proven efficient and practical. Write for circular.

Keeping Pace With the Demand

for an electric range of additional capacity at a moderate price

It is the policy with Standard to cover the entire electric cooking field with ranges to meet every requirement. The growing demand for a range of liberal capacity, real efficiency and beautiful appearance, to retail at a moderate price, is answered in this new Standard (No. 954). Handsomely finished in white porcelain with nickel trim. Equipped with three eight-inch hot-plates (open or enclosed), roomy oven (aluminum and supermetal lined), broiler compartment and convenience outlet. Built to the Standard high quality specifications throughout, and attractively priced.

* * *

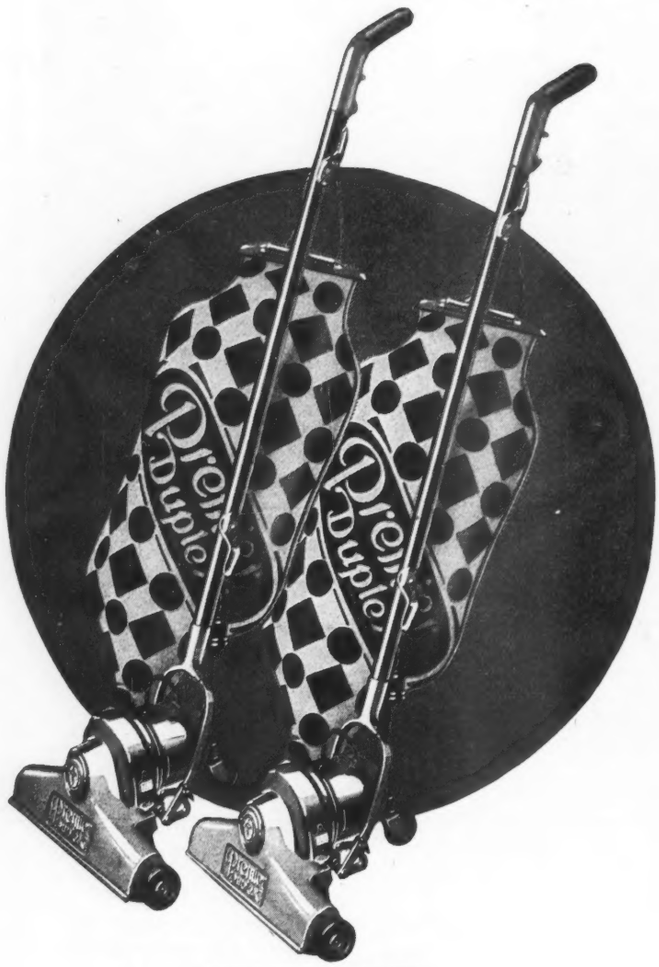
Write for the whole Standard story, including the Standard catalogue. It will give you a new idea of what an electric range line can be—a new idea of the selling possibilities in this fast-growing field.

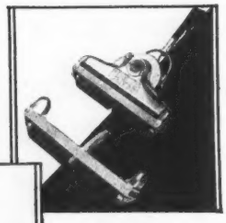
The STANDARD ELECTRIC STOVE *Company*
TOLEDO · OHIO · U·S·A

Standard
ELECTRIC RANGES

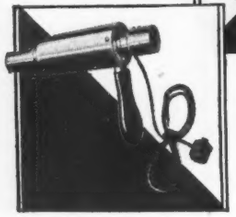
"Standard quality is never questioned"

Sell *two* cleaners instead of *one*





The Floor Polisher Accessory retails at $10.00



The Hair Dryer Accessory retails at $8.00

HERE'S an idea that will help you to make a double profit. Tell your customers the convenience of an extra Premier Duplex—one for upstairs and one for down—no need to go and fetch it when there's cleaning to be done. Saves steps. Result: *more cleaning* because a machine always is at hand. Maids and matrons will use it oftener when it's at their elbow!

The telephone company cashes in on the sale of extension phones. If the makers of automobiles can sell an extra car how much easier for you to sell two Premier Duplex! All you need do is propose the plan and make its merits known to your customers.

And there is further profit for you in Premier Duplex Accessories. The Floor Polisher Accessory and the Hair Dryer Accessory—two new and much needed features—are added arguments. They help you to resell old customers—and the Premier Duplex Repeat Sales plan makes almost every woman who owns one a prospect for another.

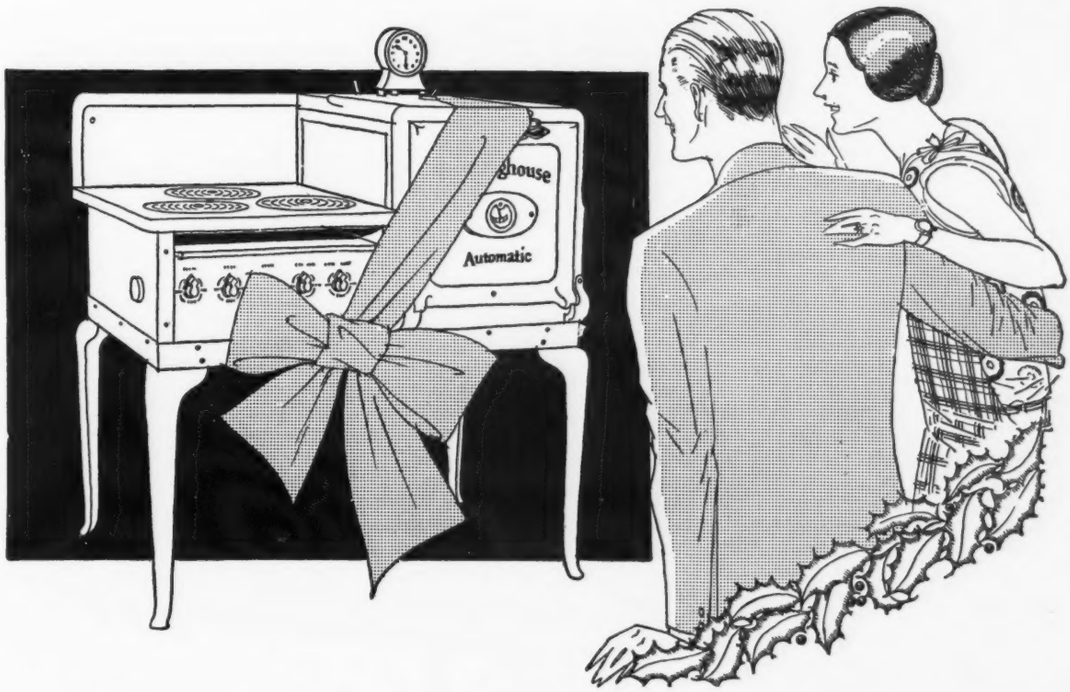
Premier Duplex

ELECTRIC VACUUM CLEANER CO., INC.

Cleveland Ohio

Manufactured and distributed in Canada by the Premier Vacuum Cleaner Co., Ltd. General Offices, Toronto

The Most Practical Gift of All



A CHRISTMAS CAMPAIGN

for Load Building and Merchandising Profit!

STIMULATE your range sales during the month of December. Increase the load on your lines. Here's a real opportunity for you to turn the money spent at Christmas time into a profitable channel.

Westinghouse offers plans and materials

In the new Christmas Range Plan Book, Westinghouse offers material and selling plans for a complete range campaign—flexible enough to meet any conditions in your territory.

Advertising material of all kinds

The wide selection of material includes: broadsides, bill stickers, gift tags, newspaper electros, posters and counter cards, Christmas recipe cards, letterheads, selling plans —and can be tied in together in any way you desire to reach every prospect in your section.

See the Christmas portfolio

Go over the Christmas portfolio with your Westinghouse representative. Let him help you work out a plan that exactly fits your territory and conditions. Select your material and premiums—you get the advantage of special discounts on premiums with a Westinghouse campaign.

Or send in the coupon and a Westinghouse man will call.

Westinghouse Electric & Manufacturing Company
Merchandising Department
Mansfield Works Mansfield, Ohio

Westinghouse

X94982

Mail this coupon today

Westinghouse Electric & Mfg. Co.
Mansfield, Ohio

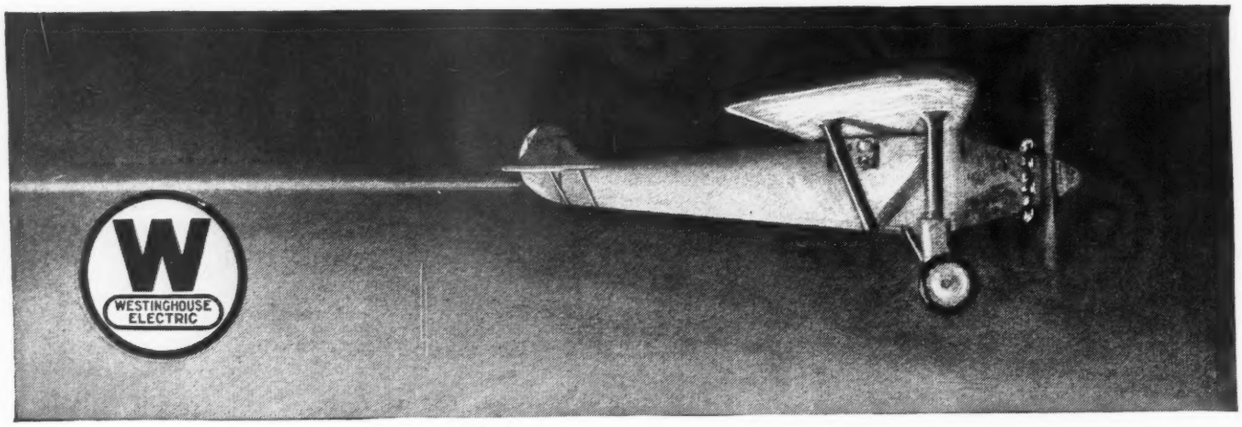
Gentlemen:

I am interested in your complete plans for a Christmas Range Campaign.

Name_____

Company_____

Address_____



The

Spirit of St. Louis

and undivided responsibility

Equipment Now Installed And On Order

21905—Hollowspun Granite Standards
19400—Luminaries
1400—Miles of Parkway Cable
34—13,000 Volt Station Type C. C. Regulators
150—Subway Type Constant Current Regulators
425—Series Transformers
3—Complete Automatic Substations
3000—Holophane Bi-lux Refractors

All Westinghouse

ST. LOUIS is an advocate of undivided responsibility.

This fact is again exemplified in their $8,000,000 street lighting program—every piece of equipment installed, from the substation to the lamps, is Westinghouse. The order for the third section has just been placed. When this system is completed, the streets of St. Louis will be lighted by the most efficient, the most modern, and the most comprehensive lighting system in the world.

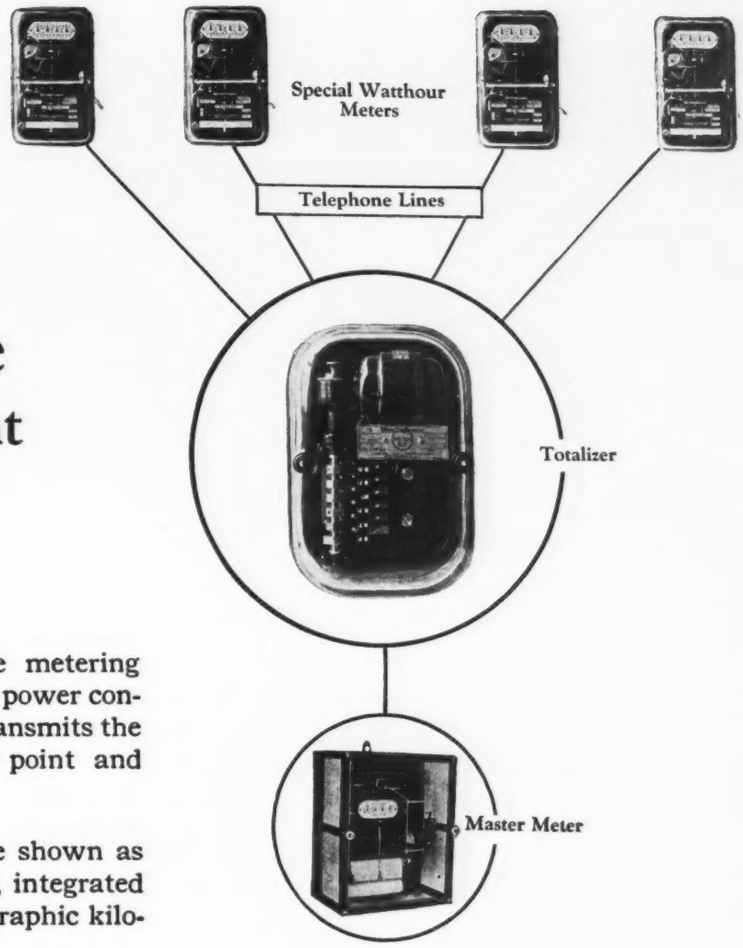
Westinghouse is the only organization in the country that can furnish such complete lighting service—such undivided responsibility.

Westinghouse Electric & Manufacturing Company
South Bend Works South Bend, Indiana
Sales Offices in All Principal Cities of the United States and Foreign Countries

Westinghouse

X94922

COMPLETE
STREET LIGHTING
SERVICE



Long Distance Power Measurement —*Totalized*

WESTINGHOUSE remote metering equipment measures the power consumption in distant feeders, transmits the measurements to a common point and adds them together.

The sum thus derived may be shown as indicated or graphic kilowatts, integrated kilowatt-hours consumed, or graphic kilowatt-hours demand.

By utilizing such long distance metering, load dispatching can be more scientifically exact. The dispatcher has before him at all times the exact load conditions throughout the power system. Emergency measures can be taken without any loss of time.

Such long distance metering can be utilized to furnish a just and economical basis for billing large power consumers. The power through any number of feeders can be totalized both as to power consumed and power demand with no loss in accuracy.

The Westinghouse system of remote metering is flexible in its application, reliable in its operation, and accurate in its results. Let us develop your requirements. Our Meter Specialist in the Westinghouse district office near you is at your service.

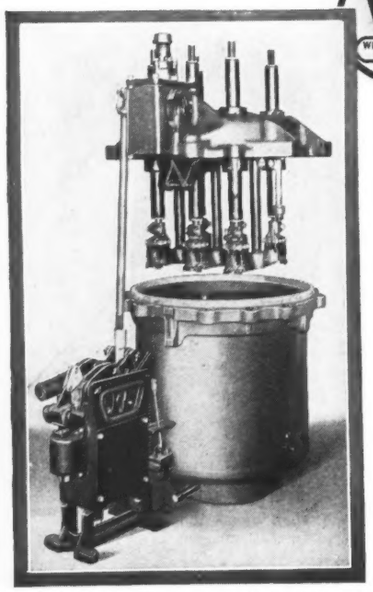
Westinghouse Electric & Manufacturing Company
Newark Works Newark, N. J.
Sales Offices in All Principal Cities of the United States and Foreign Countries

Remote Impulse Metering Equipment

Westinghouse

X93689

Small But Mighty



Type B-26 Solenoid Operated Oil Circuit-Breaker

WESTINGHOUSE has developed a line of oil circuit-breakers with extremely small space requirements for application on medium voltage a-c. circuits, in power plants, substations, and industrial plants.

They are invaluable as an aid in revamping to take care of increased loads, for they can be mounted in the same cell structures that formerly housed breakers of much lower interrupting capacities.

In new installations, much less space need be laid out for switching equipment where these new breakers are used.

Type B-16, 400-800 amps. at 7500 volts
Type B-20, 400-800 amps. at 15,000 volts
Type B-26, 400-1200 amps. at 15,000 volts

Types B-16, B-20 and B-26 Oil Circuit-Breakers

Operating Levers Inside

The operating levers are placed *inside* the breaker chamber and are actuated by a rotating shaft which enters the tank through a gas-tight machined bearing. Additional advantages resulting from this feature are:

Increased clearance to grounded parts outside of the breaker.

Lifting rods do not pass through the tank top, and the difficulty of maintaining oil-tight joints around the lifting rods is eliminated.

The outside of the breaker is free from moving parts.

All Phases In One Tank

The small space requirements result from the placing of all phases of the breaker in one cylindrical chamber which gives also the following advantages:

Greater body of oil provided.

Larger expansion chamber.

Only one tank to handle when making inspections.

More Information

Additional information regarding this line of breakers is contained in Circular 1771, copies of which can be obtained from our nearest district office.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of the United States and Foreign Countries

Butte, 52 East Broadway
Casper, Wyo., 124 W. 2nd St.
Denver, 910 Fifteenth St.
El Paso, Mills Bldg.
Fresno, Hotel Fresno
Los Angeles, 420 So. San Pedro St.
Phoenix, Ariz., 412 Luhrs Bldg.
Portland, 901-2-3 Porter Bldg.
Salt Lake City, South Temple and West Temple Sts.
San Francisco, 1 Montgomery St.
Seattle, Lloyd Bldg., 6th Ave. and Stewart St.
Spokane, 1322-23 Old National Bank Bldg.
Tacoma, 1118 Rust Bldg.

Westinghouse

X93609

Volume 59 San Francisco, October 1, 1927 Number 4

Electrical West

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power & Gas," and the "Journal of Electricity"

C. T. HUTCHINSON, *Editorial Director*
W. A. CYR, *Associate Editor*
G. R. HENNINGER, *Associate Editor*

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G. C. TENNEY, *Managing Editor*
E. J. KNOWLTON, *News Editor*
B. H. SNOW, *Northwest Editor*

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Anticipating California's Future Growth

TO meet the growth in California, the Southern California Edison Company added 429,000 horse power between 1921 and 1925. This increase is 114% compared with 54% for the whole country in the same five-year period.

The company's present capacity is 807,000 horse power and another five years' growth at this rate will see a demand of 920,000 horse power more.

A new plant now under construction will have the world's largest electric generators, the world's largest tandem compound turbines and the world's largest horizontal water tube boilers. It is designed for an ultimate capacity of 1,000,000 horse power.

This is the sixth time Southern California Edison Company has employed Stone & Webster construction service in its program of extension.

STONE & WEBSTER

INCORPORATED

DESIGN · BUILD
OPERATE
FINANCE

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Chicago, First National Bank Bldg.

San Francisco, Holbrook Bldg.
Pittsburgh, Union Trust Bldg.
Philadelphia, Real Estate Trust Bldg.

Electrical West

With which is consolidated the Journal of Electricity

C. T. HUTCHINSON
Editorial Director

A McGRAW-HILL PUBLICATION

G. C. TENNEY
Managing Editor

Volume 59 | San Francisco, October 1, 1927 | Number 4

The Alarm Clock Is Ringing— "Time to Get Up and Get Going"

WHATEVER may be the pleasures of lying abed in the morning, dreaming of the great merchandizing achievements which revolve dizzily in beatific half-awake dozing, the sad truth remains that none of these visions will begin to materialize until the covers are tossed off and the day's work begins.

The automobile people are bringing out a yearly assortment of beautiful new models; the department stores offer many fancy bargains to lure the housewife to crash their doors at nine o'clock; the "see Europe first" agencies are setting bait for the family budget; gasoline filling stations spring up on all the vacant lots; new brands of cigarettes shout for prestige and patronage from billboard and magazine page; soap, cosmetics and even patent medicines fill columns in the dailies with their claims—and what of electrical merchandise?

To be sure there are drug stores selling curling irons just as they sell lip sticks. There are department stores selling waffle irons because somehow or other people want them. There are mail-order houses selling washing machines because people have come to look to them for harnesses and shoes and oil stoves, so why not washing machines? Bakers, too, sell toasters because with them they can sell more bread to toast.

Isn't it time to wake up and set about the day's electrical merchandising business? The electrical industry may not be interested in curling irons as an adjunct to face powder, but it is interested in having hair curled at home by electric heat rather than by a hairdresser who uses curling irons heated by gas. To a power company waffle irons and toasters are not sold to dispose of flour or baking powder or baker's bread, but to keep electric cooking in the home.

Automobiles, tobaccos, chewing gum and beauty creams are forced into a market by ceaseless advertising and sales effort. There may be competition between manufacturers of these products but the public never knows it. The only ax which is evident is that which is aimed at taking a generous slice of the consumer's dollar.

For a commodity whose uses are so varied and so helpful, and for which the inventors have not yet begun to find the possible applications, electrical energy, through the medium of electrical merchandise, deserves something better in the way of treatment from those to whom its care is given.

The electrical industry must learn the lesson of advertising and apply it to itself, even as have other industries enjoying top positions in lists of figures showing how Americans spend their money. The electrical industry must quit wasting its time and its personnel's energies in civil war, in private vendettas and backyard arguments. There are customers passing the front door and their eyes are attracted to the bargain sign down the street. When they want to see fighting, Dempsey and Tunney are preferred because there is class to that sort of an event.

Most of all, the electrical industry must get under way. Most electrical merchandise today is *bought*. It is time that more of it was *sold*. The only way this can be accomplished is through effort, not waiting for some organization to start the customers running in.

There are plenty of good plans, good merchandising ideas, tried and tested methods of attracting buyers and influencing them to *buy*. The time for leisurely analysis and critical examination is past. Other good merchants are selling shoes and sealing wax and rouge and cigarettes and automobiles. We have many good kilowatt-hour-consuming electrical appliances, too, to sell. Let's be about the day's work.

Spreading the Light of Knowledge About Better Home Illumination

EVERY advance, whether in warfare, enlightenment, commerce, civilization, or just plain comfort, proceeds along pretty well established lines. The technique may vary with each kind of advancement, but the fundamentally basic method differs so little that it doesn't matter. A law can be derived governing one form of advance and it will apply in general principles to another type.

The plan or method begins with the pioneer, the advance guard, the scout or the educator or promoter. Then follows the main body of attack, the sales program or the settled production.

Pure scientific research precedes commercial utilization of the discoveries made. Great industries realize the value of such work and see that it is maintained, free to discover and develop. In a like manner the pioneer, the educator, the propagator, must be appreciated and maintained even in so concrete a thing as the sale of electric energy through the medium of lamps.

There is a certain natural market for any commodity. That market does not need to be sold; it demands that commodity. Around it there is a much wider market which must be brought to a point of desiring the commodity and buying it.

Especially is this true of home lighting. The market for electric light alone has reached almost complete saturation. New homes built each year are its only market extension, and these will demand electric service whether it is offered or not. But to reach into homes already supplied with electric lighting, such as it is, and to influence the residents of those homes to pay money for new equipment to give them what they already have, such as it is, requires more than a sales counter and a sign marked "fixtures for sale" over it. The field of acceptance must be prepared. The work calls for pioneering, for educational preparation.

It is to the credit of those interested in the sale

of lighting equipment that there are among them men and women with the wit to see the value of this type of attack upon the home market. It is fortunate that the field for better home illumination may be pioneered first by men and organizations prepared to do an educational work without immediate commercial advantage in view. In both the Pacific Coast Electrical Association and the Northwest Electric Light & Power Association the lighting bureaus are sowing the seed of educational work that the main body of the advance later may reap according to the efforts given to the task.

In some localities there is talk of "refixturing," but it is re-lighting that must be sold. Before re-lighting can be sold the public must be made conscious that present and past modes of illumination are not what they might be, good as they are as compared with the crude lighting of the pine torch or its successors.

The program of education is under way. It started several years ago with the Home Lighting Contest. It has been built up gradually to a moment at which it is crucial to advance with the main body of the army, the commercial legions prepared to bring about that which the forerunners have promised.

The prophets of true home illumination have gone, are going on before. It is high time for the profits to follow.

Some of the Ice Men Are Out of Step

IF safety razor advertising stimulated the sale of the old-fashioned "straight edge," and vacuum cleaner and carpet sweeper advertising sold more brooms, is it not reasonable to believe that electric refrigeration advertising will sell more ice? In a few isolated instances such as in Portland, Ore., ice manufacturers and distributors can see great possibilities in co-operative efforts to promote refrigeration. In most other sections, and particularly in California, the ice industry is wrought up to the point where it is spending thousands of dollars in car cards and newspapers in advertising ice with copy that is aimed directly at mechanical refrigeration.

There is no mistaking the combative and destructive tone of a slogan such as, "A Block of Ice Never Gets Out of Order." The invidious comparison between ice and mechanical refrigeration is perfectly obvious in the text, "Still Tender and Juicy—Dry cold dries foods up; ICE keeps them moist and fresh." The same is true of the statements, "No Refrigeration Costs So Little as Ice," and "There Is No Operating Cost with a Block of Ice." Some of the advertising copy used by the ice manufacturers even might appear questionable to the Better Business Bureau, particularly such a statement as, "Its Delicious Flavor Unspoiled—The cool, moist air in your ice box removes odors and impurities arising from food and sends them down the drain pipe—Only Ice Does This."

The ice industry can gain little from so short-sighted and destructive a policy as it is pursuing in its present advertising. The statement frequently has been made in these columns that no amount of "knocking" will retard the growing popularity that domestic electric refrigeration has achieved in the public fancy. Were the same amount of money being spent in the present campaign to be added to a similar amount subscribed by the mechanical refrigeration industry and the entire sum spent advertising some such slogan as, "Protect Your Food and Health with Refrigeration," it is conceivable that more good would accrue to all parties.

Considerable space in this issue is devoted to such a co-operative undertaking financed and directed by all refrigeration agencies in Portland and designed to educate the public as to the necessity for *some* kind of refrigeration. We not only commend this article to the electrical industry but urge that it in turn carry the same message to the ice manufacturers.

Cashing in on the Red Seal Investment

SAID a man well up in the industry recently, "In my opinion the Red Seal has been a big flop." He went on to point out that out of more than a million and a quarter homes wired each year in the United States and Canada only approximately seven thousand Red Seal certificates had been awarded since the inauguration of the plan. Unquestionably the same opinion prevails in many quarters. The Red Seal program has not met with the success that its sponsors anticipated or that its merits warranted.

The reason for this apparent lack of progress is not hard to find. The Red Seal Plan is an idea, sound and constructive. To the industry it serves the same purpose that a set of tools does to a workman. Without application and work there will be no Red Seal homes just as in the case of the workman there will be no concrete accomplishments unless he applies his tools. The jawbone energy expended in conferences and meetings might generate sufficient hot air to lift a balloon but it will not wire Red Seal homes. Advertising field contact work and salesmanship must back up the Red Seal idea if results are to be achieved.

That the Red Seal Plan can be made to pay dividends is shown in an article on another page of this issue in which results of a survey of 500 residences in various parts of California are presented. The figures are enlightening. Only a small percentage of homes contacted received Red Seal certificates, but the value to the industry of the improved wiring that resulted from this field work is apparent. The increase in outlets was 37 per home, every home was wired for an electric range, 49 per cent were wired for air heaters and 43 per cent for electric water heaters. When one central station commerical manager saw the results of the survey he immediately detailed a salesman to work with home builders, contractors and architects to further the interest in the Red Seal.

While the leagues that have been licensed to carry on Red Seal work have done most of the work on the Red Seal homes built in the past, they have been hampered by lack of man power. The results cited prove that the Red Seal program, given adequate backing, need not be a failure. More Red Seal salesmen will make the program a great success.

Melones Project Is Example of Practical Co-operation

THE Melones power house recently completed by the Pacific Gas and Electric Company affords a striking example of the benefits of co-operation between power and irrigation interests in the use of water. Low-head, foothill hydroelectric developments are not financially attractive today in competition with the lower construction and operating costs of steam-electric stations. On the other hand, foothill storage and control of water for irrigation and domestic use is of increasingly vital importance to the agricultural

and commercial development of many large and fertile areas in the Western states.

The incompatibility of interest that has been evidenced in some localities where there has been a divergence of demands for water for irrigation and power has been met successfully by the agreement worked out by the Pacific Gas and Electric Company and the Oakdale and South San Joaquin Irrigation Districts. By the terms of the contract the irrigation districts built the dam and accessory works, and the power company constructed the power plant. During the irrigation period from the first of March to the end of October the districts control the release of water. For the balance of the year the use of water, with minor restrictions, goes to the power company. Semi-annual payments for the use of the water for power generation will be paid by the power company for a period of forty years, the total amount aggregating almost enough to pay all interest and bond redemption charges upon the irrigation works. Thus the irrigation districts will acquire a dam and regulated water supply at practically no charge to the water users.

This joining of forces in a co-operative undertaking makes for the best possible use of natural resources to the mutual benefit of both irrigation and power interests. The irrigation districts receive the full financial benefit of the electrical by-product without diverting any capital from the primary object of developing an irrigation system.

Not only does the Melones development afford a fine demonstration of practical co-operation but it marks the beginning of a new era of water development in the Western states whereby farmers and power companies can store and use water to mutual advantage and without conflict.

Electrical Industry Is Overlooking Possibilities of Ironer Market

FOUR million grade A prospects and less than 300,000 users—that is the status of the electric ironer in the country today. A manufacturer in a recent letter to Electrical West drew attention to this market and asked why the industry has been so apathetic toward an appliance that has such sales possibilities. Here are some of the points he made: The electrically heated ironer ranks second only to the electric range and refrigerator as a load-builder. In the opinion of housewives whose homes are equipped with ironers, it ranks first or at least equals the washer and vacuum cleaner in the elimination of drudgery and in labor saving. What then, have been the resistances that have retarded sales?

In the first place, there has not been sufficient educational and publicity work directed either at the electrical industry itself or at the consuming public. The score or more ironer manufacturers have not sold the industry on the load-building possibilities of the ironer. Similarly the manufacturers, the central stations and the dealers have not convinced the housewife that the ironer is a household necessity. As a consequence the appliance is considered with indifference by the industry and is classed as a luxury by the public. Its load-building and merchandising possibilities must be demonstrated to the industry, and constructive educational work must be applied to the home field to create a favorable reaction from the housewife that the ironer is a household staple.

Ironer sales have been retarded in the past by "half-selling," and by "over-selling." In many cases the ironer has been sold and only half demonstrated, with the result that the housewife has been disappointed with results. In others, and this is particularly true in the early days of ironer merchandising, the appliance was pictured as a mechanical wizard that woud perform miracles. Over-enthusiastic statements of salesmen followed by disheartening experiences at the hands of none too expert operators have resulted in many lost sales. Expert salesmanship and careful demonstration are the two most essential requirements for successful ironer merchandising.

The problem of the electric ironer, like that of many other appliances and services that the industry has to offer, is strictly one of sales. The market that exists for this appliance will be tapped when the industry marshals an adequate merchandising and sales force and backs up this organization with suitable publicity.

Oregon Contractors Organize as Electragists

IT IS a pleasure to note the step taken in Oregon to better the condition of the electrical contractor through the formation of the Oregon Electragists. The movement was fostered by the scattered members of the Association of Electragists, International, and various independent local organizations, who visualized the advantage to the contractor of spreading the A.E.I. movement and giving it a stronger medium through which to function locally by welding it into a statewide organization. Of course, besides spreading the electragist movement, the new association will furnish a vehicle for attacking local problems, lending the prestige of a united front and the weight of a combined opinion to their solution.

If there is ever to be a "united industry," it is essential that the contractors become organized so that they can bring themselves to think and act unitedly. It is well known that the business policies of the other branches of the electrical industry have been fairly well standardized through their associations, and further, that through inter-association contact the central stations, the manufacturers and the jobbers have arrived at a common understanding of many basic principles underlying the economic structure of the industry. The A.E.I. has done much to bring the contractors' viewpoint into the councils of the industry, and to carry back to its members the broadening influence of contact with authoritative bodies of the rest of the industry. But this relationship now being effected nationally needs to be carried out locally, and this can be accomplished only where there are strong state and local organizations through which the contractors may present their side of local differences and in turn hear presented the other side.

The formation of state contractors' associations in Oregon in the past has been attended by difficulties, and at least one such organization within recent years died of internal troubles. The present movement, however, seems to be free from strife; the spectre of jealousy is laid, and harmony prevails. The men chosen to guide the association's activities appear to be intent on keeping out this spectre, and with due care and caution have committed themselves to a program of endeavor consistent with the means at their disposal. More power to the Oregon Electragists. May they better conditions for their own branch of the industry in their territory, as have similar organizations in other states, and prove, through such betterment, to be an influence for the good of the industry as a whole.

What Kw-hr. ----

H. H. Courtright has at his fingertips at all times the complete data as to quotas, methods and results of his stimulative appliance campaigns. Mounted on a rack above his desk he keeps a graphic record of all the activities of the Valley Electrical Supply Company, of which he is manager.

ONCE a central station answers for itself without qualification just one question with respect to merchandising its entire course can be plotted accordingly. This is the opinion of a successful merchandiser and of the executive of the power company for which that merchandising is being done.

The single question, shorn of extraneous trimmings, may be condensed into these words:

"What are we in business to sell—kilowatt-hours of electrical energy, or electrical merchandise?"

Obviously, it will be answered, the central station is in business to sell electrical energy. No less obviously it will be shown that electrical energy as such is of no commercial value until transformed by means of appliances into useful service. Therefore, the selling of electrical appliances becomes a logical function in order that through them kilowatt-hours may be sold.

Enthusiasm to sell merchandise of itself, however, has so often submerged the original purpose, that of selling kilowatt-hours, that many central stations have found themselves with the tail (merchandising) wagging the dog (kilowatt-hour sales), to the detriment of general industry relationships.

OF every dollar in revenue for the first year from an electric appliance this company invests **35** *cents in a selling and promotional plan which insures it a continued revenue from that appliance.*

A. E. Wishon, vice-president and general manager of the San Joaquin Light & Power Corporation, of Fresno, Calif., in a recent letter to J. E. Davidson, chairman of the National Commercial Section, N. E. L. A., set forth in characteristically straight-forward stye the policy which has determined the merchandising practice of that company. His letter was one in response to an inquiry as to the relationship between the San Joaquin company and the Valley Electrical Supply Company, its merchandising subsidiary.

Beginning uncompromisingly by stating that the Valley Electrical Supply Company is operated as a separate merchandising corporation, doing its own financing, purchasing and operating, paying for its rent and light as would any other merchant occupying the same space, keeping a rigorous accounting system audited each month, assuming all merchandising expenses of every sort, handling all of its accounts between customers and itself without privilege to use the power company's consumers department, Mr. Wishon went on to declare:

"Not being satisfied with the natural growth of our domestic appliance load, and at the same time recognizing that the margin of profit on electrical appliances is not sufficient to **campaign continually, to force-feed, demonstrate, properly advertise and continually to educate the public to the further use of these appliances,** we have each year entered into a contract with the Valley Electrical Supply Company to distribute over our system during the year a quantity of current consuming devices. For this service the San Joaquin agrees to pay a stipulated sum for each kilowatt of applances thus sold.

The contract between the San Joaquin Light & Power Corporation and the Valley Electrical Supply Company is a hard boiled contract. For every dollar that the power company pays the Valley Electric on this contract the power company receives a revenue of $3 in return the first year, and $3 every year therafter. Figuring on a five year revenue, in that case, for every dollar paid the Valley Electric the power company will receive $15 in revenue.

How such a plan works out to the benefit of the central station is shown further by H. H. Courtright, manager of the Valley Electrical Supply Company, by the following figures:

Taking a basis of 1,000 electric ranges, sold in a year, say, by any average company as compared to 1,000 ranges sold by the Valley Electrical Supply Company for the

Are We Selling ---- or MERCHANDISE?

When BUILDING UP A LOAD and then MAINTAINING IT are considered Far More Important Than Mere Volume of Appliances Sold, Every Retail Outlet Available Can Be Developed as a Logical Unit of an Unceasing Campaign to Keep Current Consuming Devices on the Line and Thereby Earning Revenue.

San Joaquin Light & Power Corporation, the resulting revenue over a two year period alone shows a significant difference. The average revenue from a range is given as about $40. For 1,000 new ranges, assuming that the selling expense was met by the campaign and therefore cost the company nothing, the revenue for a given year would be $40,000. The second year would bring in a similar revenue of $40,000, a total for two years of $80,000.

On the San Joaquin system, because of the intensive advertising, promotional and demonstration work to keep every range sold and used to the maximum, to stimulate its use for more numerous occasions and for longer periods, the average revenue per range kilowatt connected is $12.50 per year. The average revenue per range therefore is better than $87.50 per year, as against the general average of $40.

For 1,000 ranges, at $87.50 per range, the first year's revenue would be $87,500, less the selling cost or charge to the power company for selling the load. This charge, based upon connected kilowatts, is approximately $35 per 7-kw. range. For 1,000 such ranges the cost would equal $35,000 which, taken from the $87,500, would leave a revenue for the first year of $52,500, as against $40,000. The second year would yield a revenue of $87,500. The total for the two years would be $140,000 as compared to $80,000, or almost twice as much.

Upon such a basis it can be seen wherein Mr. Wishon looks to the Valley Electrical Supply Company for $15 of revenue over a five year period for each dollar paid it for making the sale.

Two Jobs to Do

By the terms of its contract, therefore, the Valley Electrical Supply Company, according to Mr. Courtright, has two definite responsibilities.

The first is to sell current consuming appliances.

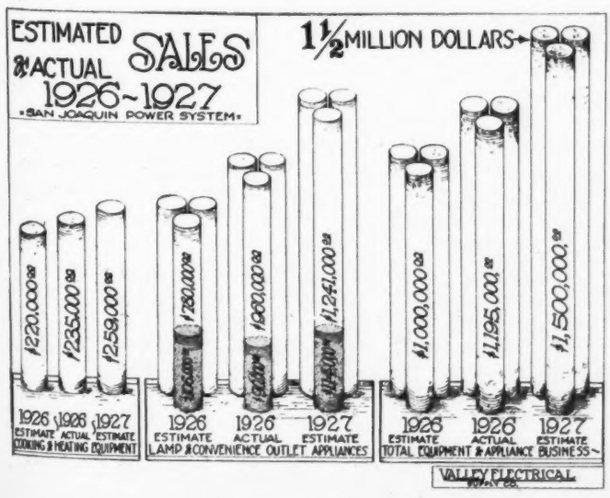
The second is to keep these appliances in use and consuming current.

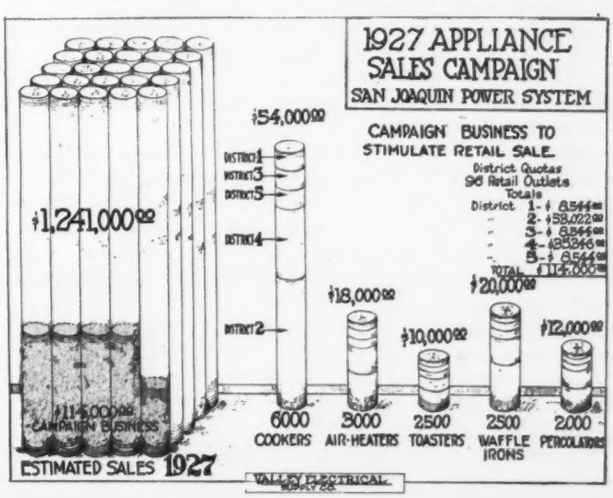
Each of these responsibilities has its definitely established and well understood requirements, as well as its methods and plans designed to meet them. Although they may overlap in many instances these two lines of activity are no less held up as goals to which every member of the Valley Electrical organization must work. Because the use of appliances once sold depends so closely upon how well and in what manner they are sold originally, the link between these two activities is forged strongly.

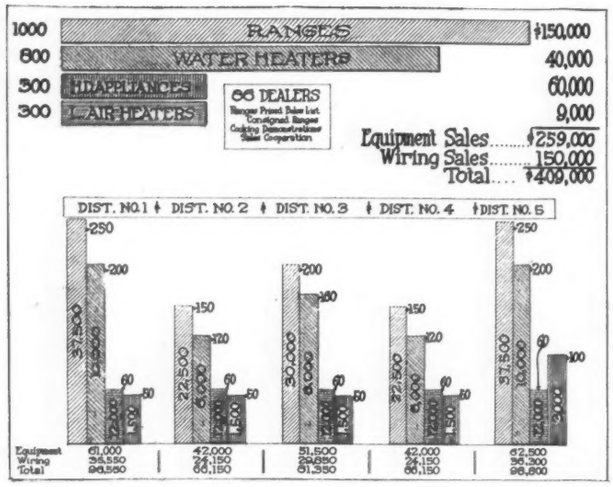
The First — To Sell

With the policy thus established, how shall the work be accomplished? The first step has been the establishment of quotas; the determination, in other words, of what shall be required of the Valley Electrical Supply Company in the way of actual results—measured in kilowatt-hours—under the terms of the contract. Of this Mr. Wishon states:

During September of each year we meet with the Valley Electric manager, our power company sales manager and other department heads and discuss the results accomplished on our contract with the Valley Electric for the past year, and at the same time frame our contract for the following year. Prices charged by the Valley Electric for their services are raised or lowered by the results of the past year's profit shown or by the power company demanding a further service, always keeping in







mind that we, as a power company, can afford to pay for this class of business.

The charts accompanying this article give the quotas established and the results accomplished under the plan. They show also the volume expected from special sales (in color) and that expected from the sale of nationally advertised list price appliances.

Developing Retail Outlets

When it is to the advantage of the merchandiser to place all possible revenue producing devices on the line it is also to his advantage to use every possible and available outlet for the sale of merchandise which will accomplish that result. From this fact has sprung the "through-the-dealer" plan of selling appliances which has earned for the Valley Electrical Supply Company national recognition.*

Good business dictated that every workable selling outlet be employed. It was in no sense a philanthropic gesture. Such a course could be made to pay. And because the individual electric dealer, the hardware and furniture merchant, anyone selling electrical merchandise, could make money by co-operating with such a plan it has found ready acceptance and support. Again, no bigness of heart on the part of the dealer was involved; it became a matter of simple good business.

Two other features of the plan resulted from a logical carrying out of the object in view—selling kilowatt-hours. Appliances selected to be campaigned must be of a kind which for their selling price are comparatively large current consumers. Toasters, waffle irons, percolators, cookers, and other heat operated devices come under this classification. The low consumption appliances employing motors and costing much more per unit, such as washers and cleaners, were not selected for campaigns.

There were two reasons for this. These appliances are being sold in sufficiently large quantities by retail outlets already established. They enjoy popular acceptance and do not need this campaigning.

Secondly, such appliances tie up the woman's family budget for so long a period that she can only buy one such appliance a year.

The lower priced appliance, sold on payments which will guarantee its being kept after the initial payment is made, and owned in two or three succeeding payments, allows the housewife to buy another appliance every three or four months.

Space does not permit a full detailed account of the "through-the-dealer" plan as employed by the Valley Electrical Supply Company. Except for minor changes the description given in these columns last year (See Journal of Electricity, Oct. 15, 1926, pp. 270-276) is a complete one.

Plan Kept Flexible

One thing may be credited to the plan which Mr. Courtright has evolved. He has kept it in flux. Wherever it has shown a tendency to work to the disadvantage of any one group in the industry, and thereby jeopardise its effectiveness, he has been quick to make the necessary reinforcements where needed.

When it was first tried the jobbers handling standard lines of appliances were prone to feel that their merchandise was suffering as a result of the campaign appliances being sold. To remedy this situation the quantities of campaign appliances sold to the dealers were limited so that they would move fast and be sold out quickly. This had the effect of stimulating the sales of standard lines and of bringing the housewives out for special sales early, keeping the campaign snappy as well as eliminating danger of overstocking.

To further the sale of standard lines Mr. Courtright adopted the plan of giving notice to the jobber salesmen serving his territory of the approach of a special sale in order that they might follow the Valley Electrical Supply Company salesmen and stock up the dealers with standard appliances to be sold in preference to the specials. In many cases the jobber salesmen and Valley Electric salesmen have visited the retail outlets together.

Preparing the Shock Troops

It is not to be imagined that mere offer of such a proposition to the retail outlets would find acceptance at face value. Although the advantages of the plan to the dealer are many, few dealers were willing to go into it and conduct it successfully if given the chance.

One of the first requirements for harmony is understanding. If the dealer could be shown the purpose of the plan frankly, shown its benefits not only to the central station but to the contractor-dealer or other merchant outlet, if, in other words, this volunteer selling force could have instilled in it the enthusiasm of a paid selling force, then better results might be expected from the operation of the plan.

It was at this point that the first step toward the second task given the Valley Electrical Supply Company was taken. Before the customer could be sold the *further use* of the electrical appliances purchased the merchant selling those appliances had to be sold the necessity for selling *use* along with the appliances.

A series of lecture-meetings with dealers in the various districts served by the power companies were arranged. In order to show graphically and emphatically the various phases of the entire program Mr. Courtright and his advertising manager, J. U. Berry, assisted by all members of his organization in the compilation of information and the furnishing of ideas, worked out a series of charts. With these charts Mr. Courtright carried personally to the dealers in his territory the direct message of his appliance campaign. *He became in effect the sales manager directing a volunteer chain store organization.*

This lecture with accompanying charts was given recently at the Commercial Section meeting at the Pacific Coast Electrical Association convention at Santa Cruz; again at the convention of the Association of Electragists, International, at St. Louis and will be given at the California Electragists convention at Riverside, October 15, 1927.

*See page 242

Keeping Appliances in Use

It is to the second assignment of the contract that the Valley Electrical Supply Company is turning more and more, that of keeping in use the equipment sold to customers and increasing this use wherever possible. This activity is seldom undertaken by either the merchandising department or the individual dealer. Once an appliance is sold the responsibility ends, in the majority of cases.

The terms of the Valley Electric contract, however, stipulate that there shall be *stimulation of the further use of these appliances.* For this the power company pays. It expects results spelt in kilowatt-hours. It is a "hard boiled contract" and the reckoning is made each year before a succeeding year's contract is entered into.

Such a job the central station cannot expect the individual dealer to partake in unless it is to his advantage to do so. To show the electrical retail outlet the necessity for such action one very effective chart is used in closing the lecture-meeting.

It is a chart showing a set of balances, on one side of which are depicted the services offered by other industries which compete with and take away from the labor in the home. These are substitutes for home life and home activities which threaten to make the American home a mere place to sleep and in which to hang up a few clothes, to eliminate the kitchen and leave only a hot plate instead of a range.

In each instance there is some conterbalancing electrical service available which would minimize the labor connected with home keeping, give comfort, convenience and even entertainment and pleasure and would keep the home intact and preserve its traditional place in family life. These other industries are selling their services by campaign and ceaseless advertising. It is up to the united electrical industry working together led by the central stations and with all branches of the industry participating in a well organized plan, to sell the housewife on the comfort giving appliances available to her.

Home making must be made interesting and exciting. The Valley Electrical Supply Company is busy devising ways to make it so. Cooking demonstrations are given frequently. Recipes are solicited and distributed. New ideas in the use of appliances are developed and information regarding them is broadcast.

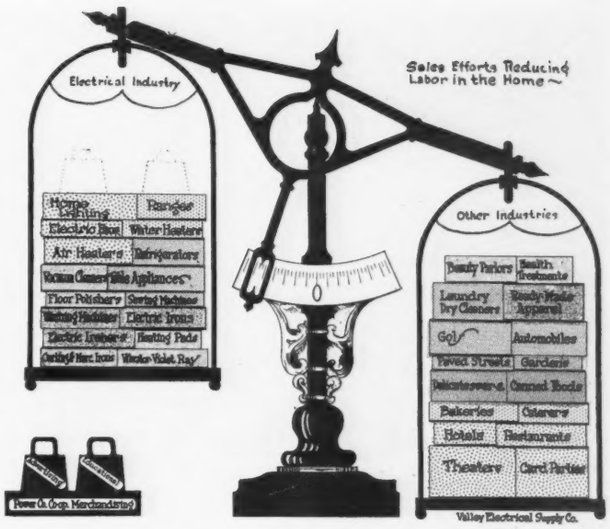
The electric cooker pot is developed as a biscuit maker. The electric waffle iron is shown to be capable of making delicious cakes and desserts as well as the family breakfast *piece de resistance.* Use is talked. Use is demonstrated. Use is encouraged and stimulated by work, by example, by service to disabled appliances and by carefully planned direct-mail material.

To eliminate the water-back and to insure a water heater installation as quickly as possible ranges are not sold where an old fuel range remains in the kitchen. More time is taken on such a sale to demonstrate the economy and value of both electrically operated range and water heater and the value in installing them together. In this way 8 out of every 10 range customers have a 5-kw. electric water heater where a ratio of 4 in 10 is considered high elsewhere.

Other forms of stimulative activity used are frequent small demonstrations, displays at fairs, using district offices as display rooms and a high grade engineering service to builders and architects.

Results

No better answer as to the value of this set-up can be given than that of Mr. Wishon in concluding his description of the plan and its results:



My idea in keeping the merchandising department separate from the power company is that to do a merchandising job we should have a merchandiser to do it, and the further we can keep it from the power company the less chance that department has to hide behind smoke screens such as public relations, public policies, etc., duplication of effort and mixing of accounts in making sales.

By our present merchandising method we feel that we have accomplished the following results:

1. An accurate cost system of merchandising sales.
2. Control on consumer contact, knowing exactly what is promised our consumer.
3. Control on the quality merchandise being sold to our consumers.
4. Control of power company sales quota for the year.
5. Domestic and commercial electrical appliances and equipment properly displayed and advertised.
6. Continuous education on domestic and commercial appliances and equipment by actual demonstration.
7. Power company carries no stock of electrical merchandise, which means no depreciation on shopworn or out-of-date stocks.
8. Electrical merchandise displayed in all power company district offices is not in power company stock.
9. Power company is carrying no term accounts or accounts receivable with its consumers covering electrical appliances or equipment, which means no reserve or bad accounts.
10. An up-to-date electrical merchandising division.

This is figuring dollars and cents only and does not take into consideration service to our consumers, good will, public contact and keeping our merchandising division in synchronism with the progress of our electrical industry.

I am sure it would be possible to sell these appliances at a profit, that is, to sell a smaller volume and perhaps make a showing of profit on straight-away merchandising, but there would be less load-building value in such a method.

"The power company is interested also," concludes Mr. Wishon, "in maintaining favorable and friendly relations with the dealers, which, under the policy now prevailing, we are able to do. The work of demonstrators and the following up of appliance sales to educate the housewife to the further use of them is, in my opinion, bound to result in increased consumption and in consequence, additional revenue to the power company."

"By this method of merchandising the united electrical industry is given a better opportunity to serve the public."

This and the facing picture are used to show effects of improper and correct lighting for home study.

Through the Home to the

EYESIGHT is one of Life's most precious possessions. Especially do people watch and guard the eyesight of their children. Anything which touches upon the conservation of vision in young eyes reaches deep into public consciousness. And yet nothing has so much to do with vision as the very phenomenon of light itself.

While this relationship of light to vision always has been recognized as obvious by the electrical profession little thought has been given to the force of the simple, elemental desire on the part of all people to preserve as much as possible the invaluable instruments by which they are able to see.

In other words, when the electrical industry has talked lighting it has talked from its own viewpoint entirely. It had electric lighting to sell. The public was thrilled at first by the possibilities of receiving light from electric wires. As electric lighting became more a commonplace and less a miracle the public lost its interest in mere lighting as such.

If anything, due to abuses of lighting practice, to glare and similar harmful conditions, the public has begun to swing away warily from the idea of "more lighting." More lighting of the same sort as the lighting of old meant the presence of more extremely bright spots which would jar vision and strain the eyes. The natural reaction has been for less instead of more light. The offending ceiling fixture, extremely bright if it were to light a room sufficiently, and always in full vision, went first. The ceiling fixture had never been a very decorative or artistic piece of apparatus, hanging there in full view, anyway.

The result has been a wide swing toward floor lamps, brackets and other types of freak lighting at the expense of genuine illumination. The effect was prettier, anyway, even if it was harder to see well, thought the housewife.

Aroused to the realization that real lighting must begin at home, that harm was being done not only to the lighting profession but, more important, to the eyes of the public, especially to the eyes of children studying in the home under present-day freak lighting conditions, the lighting bureau of the Commercial Section of the Pacific Coast Electrical Assocation, conceived for its present year's work a campaign for more intelligent and more efficient and practical home lighting.

There have come from the East many rumblings of re-fixturing campaigns. To the lighting bureau re-fixturing alone did not seem to be the solution to the problem. Re-fixturing, without a previous preparation of the public to accept new fixtures and discriminatingly to demand scientifically correct fixtures, would be wasted effort if not in the long run really treacherous, in the opinion of Clark Baker, then chairman of that bureau. New fixtures could only be acceptable to the public upon the basis of improved, scientific, adequate illumination. And illumination would be just an empty word unless it could be shown clearly that it meant, not just "more lighting," but the health and the eyesight of children both in school and at home.

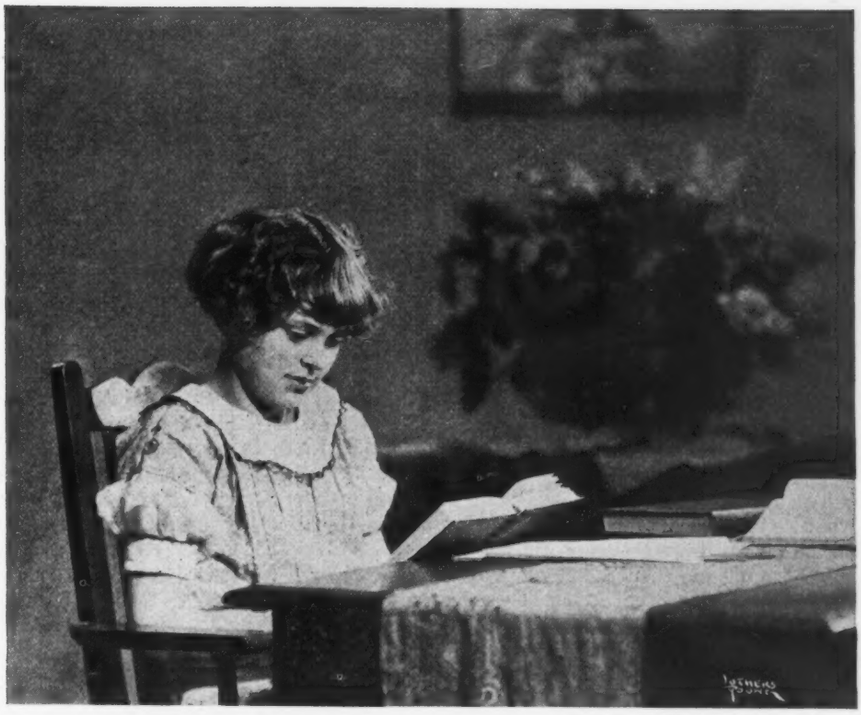
With a feeling that the program of educational work would reach such wide proportions as to become in truth not a lighting bureau work alone, but an industry work, the co-operation of other organizations in the

Effect of glare in a school room.

Through the

School to the

How it is Planned to Drive Home the Story of Conservation of Vision by Means of Correct Illumination.



P.C.E.A. was sought. Because the Advertising-Publicity Section, in its "Book of Standards" had offered assistance to any other group, that section was approached first. It was asked to appoint a committee to design and have printed a circular to be distributed in connection with the talks to be given before women's clubs and Parent-Teacher organizations throughout California.

The merchandising committee of the Commercial Section also was invited to assist in the arranging of dates for talks and in other details. After the preliminaries of the program had been outlined at the convention at Santa Cruz the recently appointed chairman of the Women's Committee, Mrs. Ruth E. Creveling, volunteered the services of the women in the industry to assist in the program.

The educational lighting committee, as it is called, of which Clark Baker is chairman, is to work under the lighting bureau chairman for this year, G. H. P. Dellmann. Its purpose will be to carry a message of conservation of vision through correct use of light and lighting equipment. It is planned to reach the schools through the medium of the Parent-Teacher Associations and thus through the schools to reach the home. It is planned to reach the home directly through the women's clubs and through them to reach back to the schools.

For the Parent-Teacher groups the lecture given will be approached from the angle of the steps being taken by school authorities to preserve the vision of children under their care. It will be shown that all these efforts for eyesight preservation will be nullified if improper lighting conditions at home force the child to read or study under conditions which the modern school no longer tolerates.

To the women's clubs the approach will be through the home, its decoration and the place which light plays in the decorative scheme. But, it will be pointed out, if decorative effect is gained at the expense of the eyesight of the children in that home who may have to read or study under intolerable lighting conditions, the good work being done for eyesight preservation in modern schools will be destroyed.

It is planned that two Parent-Teacher groups will be given the lecture for every 50,000 population and that one women's club will be reached in every 50,000 population. In this manner fifteen cities and towns in the northern section of the territory will be reached and fourteen in the southern section.

Immediately following the talks given in each community, the power company serving that community has agreed to circulate to all of its residential consumers the special little dramatic pamphlet prepared by the Advertising-Publicity Section. The merchandising committee of the Commercial Section has charge of the mailing or distribution, each company selecting the method whereby it chooses to distribute the pamphlet to its customers.

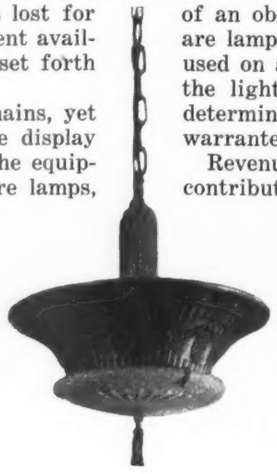
The pamphlet, of which more than 1,500,000 copies will be distributed in the territory, is built around a series of four dramatic photographs designed to show the effects of harmful lighting in contrast to good illumination.

Relighting the Home

By LEONARD A. HOBBS, *Pacific Co*

SINCE the school essay contest on home lighting there has been increasing interest shown in the matter of better and more adequate home illumination. This has resulted finally in the development of new and properly designed equipment to produce the desired results. It is felt by some that the money and effort expended on that activity largely was lost for the reason that there was not proper equipment available which would conform to the standards set forth at that time.

The interest created in the home still remains, yet when a prospective purchaser calls at the display rooms of the fixture dealer, 95 per cent of the equipment found on display is shown with bare lamps, having been designed apparently primarily for decorative purposes with little or no thought to illumination, which is the real purpose of fixtures.



Lamps developed to give higher efficiency, such as are used in the majority of fixtures in the homes today, produce glare and are not only irritating to the individuals who use them, but are harmful to the eyes. The result is that many fixtures are now being equipped with low wattage lamps which can never furnish satisfactory illumination, and the load derived by the central station serving them is not sufficient to justify an adequate return on the investment which they must make to serve these customers.

Since more than half of the fixtures used today are of an obsolete type, and since half of the remainder are lamped with low wattage bulbs, or are not being used on account of the irritating results produced by the light which they furnish, it is obvious that a determined effort to change these conditions is warranted.

Revenue produced from illuminating current today contributes only 35 per cent of central station income. Yet over 65 per cent of the investment in central station property is in equipment to produce this illuminating current.

Since 1924 the new residential customers added each year have shown a decided decrease. During the same time the current-producing equipment of the country has been expanding steadily to such an extent that new means must be found to increase the current consumption to keep pace with increased producing capacity.

Considering the fact that illuminating current produces the highest rate of return of any service provided by the central stations it is obvious that any effort in load building should be concentrated on that part of the service which represents both greatest profit

Dealers should be prepared to display and supply lighting equipment of the new standards in order to capitalize upon the good work that has been started.

Whose Job?

District Manager, Edwin F. Guth Company

possibilities and largest present investment. This is further emphasized by recent surveys which show that the average annual residential load is 400 kw-hr. returning an average annual revenue to the central station of $29.24. This is less than any other item on the family budget, except stationery and postage.

The kitchen lighting campaigns which have been carried on by many of the central station companies have proved in most cases successful and highly profitable. One Western company sold 30 per cent of its residence customers. This resulted in a marked increase in revenue. As a result of this successful pioneering work the kitchen lighting unit of today has become a standard of equipment for the lighting of kitchens in all new homes. This has proved profitable to the entire industry. The power companies took nothing from the dealers, for sales were made only to old homes, while the dealers' efforts have been concentrated on new homes.

An indication of a lighting consciousness which is being developed rapidly by the householder is to be seen in the large volume of sales of floor, bridge and portable lamps. It is the logical time to start on a re-fixturing campaign—perhaps the term relighting campaign would be better—and it remains only to formulate a plan that can be carried out successfully.

In a recent survey of the power companies of six Western states, a marked majority of the commercial and merchandising managers expressed a desire to get into re-lighting campaigns. Some were in favor of trying to carry on the campaigns through the local dealers. Their plans varied; one company advocated the dealer carrying out the campaign with only the moral support of the power company, but in most of the other instances where campaigns were being considered the power companies were contemplating doing the advertising for the dealers and allowing the dealers to use the power companies' sales forms where the customers desired to purchase on a deferred payment plan. One power company planned to purchase the equipment and consign it to the dealers desiring to enter the campaign. It would do all of the advertising, train the dealers' salesmen, take the time payment paper, and allow the dealer a liberal commission for selling and installing.

THE home has been awaiting the follow-up on the Home Lighting Contest. Who is to undertake the task—dealer, contractor, jobber, central station, or all working together?

The desire of most of the officials who had had experience in campaign work of this nature was to do their own selling for several reasons—the principal one of which is that such work is largely of an educational nature and therefore expensive, with no hope of any great profit resulting except to the central station in the way of increased revenue. It would be more difficult for the dealer to get into the home than it would for a representative of the central station, and from the viewpoint of the central station there is involved something more than merely increasing the load, namely public relations. There are few central station companies who care to be represented by a dealer's salesman, and it is doubtful if many dealers would care to assume such a responsibility. When all is considered it is believed that the dealers will prefer and urge the central stations to enter home re-lighting campaigns to demonstrate to the home owners what can be accomplished in the way of proper and adequate illumination. It will create a desire for the proper equipment, largely eliminating the sale of the cheap and useless equipment now being sold, and establish a new standard in home illumination.

It is neither the desire nor the intention of central stations to go into the fixture business, but carefully to select and sell a few pieces of the proper equipment suitable for the majority of homes, and to be appropriate for the various rooms in the home, which will be sold only over a definite campaign period of sufficient duration to cover present consumers.

The idea is to create better lighting. This does not mean merely the replacing of an old fixture with a new one. It means the selection and sale of a piece of merchandise that will raise the standard. It must be of a style that will adapt itself to most surroundings, and more important still, produce proper and adequate illumination.

It is a recognized fact that the best form of illumination is that which nearest approaches daylight. The light should be evenly distributed throughout the room and no conspicuous light source should be visible.

The residence lighting market amounts to two and one-half times that of commercial and industrial lighting combined. In a city of 100,000 inhabitants the relighting business covering unquestionably obsolete equipment, at very moderate prices, would be $400,000. Therefore, if the central station during the campaign sold $50,000 worth there would still remain a possibility for $350,000 in relighting business for the dealers, all of which would be partially sold because of the efforts of the central station during its campaign.

The symbol of adequate wiring. Copyright 1925 by S.E.D.

Red Seal Declares It

By VICTOR W. HARTLEY

Executive Secretary, California Electrical Bureau, San Francisco

FRANKLY, when you stop to consider it, doesn't it seem as though the electrical industry is full of "Orphant Annies"? Each of these little offspring came into being as a plan for more business; most of them were sturdy little plans with every promise of a hardy youth and a ripe, productive maturity; but most of them were born only to be pushed aside carelessly, undernourished, while new little plans were being launched in the world. Many of these plans have languished without ever having a chance to realize the fond hopes once held for them; others still are to be seen struggling along, threadbare, with only an occasional push to keep them on their way.

We do need more business in the electrical industry. Throughout the entire United States the all-absorbing interest of the industry is to increase sales. Chairman J. E. Davidson of the Commercial Section of the National Electric Light Association sounded the keynote in his slogan, "Sell More Kilowatt-Hours." But how can this best be done? That is the question—how to sell more wiring supplies, more appliances, and more kilowatt-hours? The answers are legion. Every commercial man doubtless has his pet; but the purpose of this article is to push forward one little offspring of the electrical industry which *must not* be permitted to become an "Orphant Annie" because within it lies the soundest, most practical, most readily adaptable solution to the problem for every branch of the industry.

What power company, manufacturer, jobber or contractor is disinterested in an increase of 37.2 branch-circuit outlets in every new home? Who, in the electrical industry, is there who is not interested in seeing the number of homes wired for ranges jump from 0.9 per cent to 100 per cent; wired for air heaters jump from zero to 49 per cent, and wired for water heaters jump from zero to 43.3 per cent.

Surveys have been made of some 500 homes taken at random throughout California. These homes have been divided into three classes: first, those upon which no effort was made to sell the Red Seal Plan; second, those on which Red Seal effort was made but which was unsuccessful; and third, those homes wired up to Red Seal standards. The surveys resulted in the acquisition of figures showing the number of lighting outlets, switch outlets, convenience outlets, size of service conduit, wire, and meter switch, and the number of lighting circuits and convenience outlet circuits in every home inspected; as well as in showing which homes are equipped with range service, water-heater service and air-heater service. The comparative averages of the homes in each class are a revelaton, as may be noted in the accompanying charts.

The most noteworthy consideration revealed by these figures is that the homes upon which an unsuccessful Red Seal effort was made were built up to a standard virtually identical with the averages of the Red Seal homes themselves, only failing to secure Red Seal certificates because of the fact that the range service has been only partly installed, or some such minor consideration as the refusal of the owner to put lights and convenience outlets on separate circuits.

Take, for example, one tract in San Francisco where notable increases have been made in the electrical installation, yet which does not show on the Red Seal reports. The builder had standard specifications for his homes which called for a main service in ¾-in. conduit and a total of 53 branch circuit outlets. Through the efforts of the California

TABLE I—RECAPITULATION
of
Survey of Residential Electrical Installations

		*CLASS 1 HOMES	*CLASS 2 HOMES	*CLASS 3 HOMES
Lighting Outlets	Ceiling	12.7	21.6	16.3
	Bracket	1.7	11.8	16.5
Switch Outlets	Single-Pole	11.0	14.6	14.7
	3-Way	2.1	3.9	6.0
	4-Way			0.2
Convenience Outlets	Single	8.4	17.7	16.0
	Double		2.6	2.7
	Radio	0.3	0.9	1.4
Circuits	Lighting	2.2	4.1	5.0
	Conven-Out.	1.0	2.9	3.5
Air Heaters	Wall		0.5	1.35
	Portable		0.04	0.43
	% of Homes Wired for heat		49 %	46 %

The above figures represent the average number of each item installed in each home surveyed.

Ranges	Full Service	0.9%	3.1%	100%
	Part Service		85.8%	
	No Service	99.1%	11.1%	
Water Heaters		0	1.0%	43.3%

The above figures represent the percentage of homes equipped with the specified services as compared with the total number of homes surveyed.

ELEMENTS IN MAIN SERVICE					
	Conduit	½"	2.6%		
		¾"	95.6%	10.2%	
		1"	0.9%	0.3%	
		1¼"	1.9%	3.0%	62.1%
		1½"		86.2%	24.3%
		2"		0.3%	13.6%
	Wire	2-10s	87.8%		
		2- 8s	2.6%		
		3-12s	0.9%		
		3-10s	7.8%	95.7%	
		3- 8s		1.3%	
		3- 6s		1.8%	
		3- 4s	0.9%	0.6%	54.1%
		3- 2s		0.6%	35.1%
		3- 0s			2.7%
		3-00s			2.7%
		3-000s			5.4%
	Switch	30A	96.5%	96.7%	
		60A	3.5%	0.9%	27.0%
		100A		2.1%	54.0%
		200A		0.3%	16.3%
		300A			2.7%

The above figures represent the percentage of homes equipped with the specified sizes of service as compared with the total number of homes surveyed.

*Class No. 1 Homes are those upon which no RED SEAL effort was made. Class No. 2 Homes are those upon which unsuccessful RED SEAL effort was made. Class No. 3 Homes are those upon which successful RED SEAL effort was made.

Its Dividends

A Red Seal tract. More of these will increase business for all branches of the industry.

Electrical Bureau representative, endeavoring to make this tract Red Seal, the main service conduit has been increased to 1½-in., the branch circuit outlets increased to 74, a 1,000-watt heater has been added in each bathroom, and a range outlet has been installed in each kitchen, with the conduit stubbed through the floor to the basement. Because the builder has not yet been convinced of the advisability of completing the range installation, his homes are not Red Seal, and do not show on the Red Seal reports; but the value of this effort is evident when it is realized that he is building 285 homes under these improved standards, which means an increase of 6,140 outlets in this one tract alone. In so far as the amount of material and labor is concerned, and as potential users of current, the Class 2 homes offer practically the same market as the Red Seal homes.

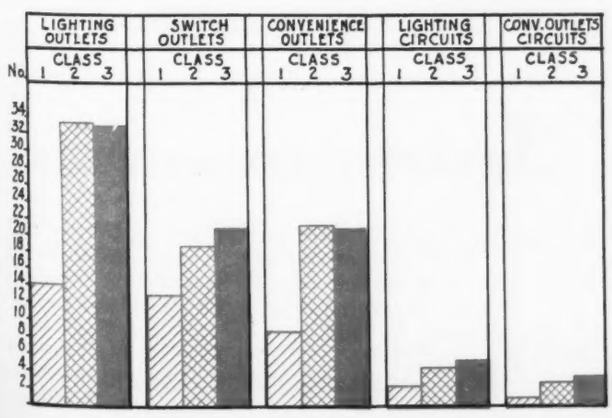
The figures shown in Table I are fact; they do not represent a projected curve of future business, or what might be if conditions remain as they are, nor do they represent the result of a survey of 10 homes multiplied by 50 to see what would exist in 500 homes; they are actual figures showing the installations which have been made in actual homes. In estimating the money value of the increased installations due to Red Seal effort, a most conservative cost of $2.25 per outlet has been used, which shows an average increase of $83.70 per home in labor and material in the branch circuit work alone. Let him who would still question the value of the Red Seal Plan add to this the increased income from larger service and power circuits.

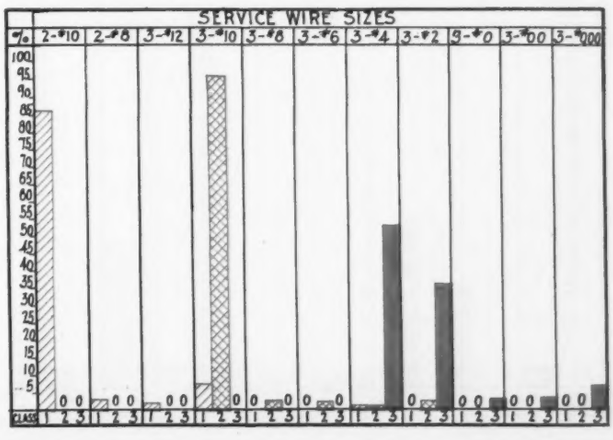
Let us multiply the $83.70 by the 369 homes included in Classes 2 and 3 in the survey and we have an increased income of $30,885.30 for labor and material *in branch circuit work alone,* due to Red Seal effort on these homes. And this does not take into consideration any of the unsurveyed Red Seal homes of which there are over 1,000 in California, nor the thousands of unsurveyed non-Red Seal homes upon which Red Seal effort made similar increases, nor the 9 apartment houses with a total of 260 apartments, all of which are wired up to full Red Seal standards.

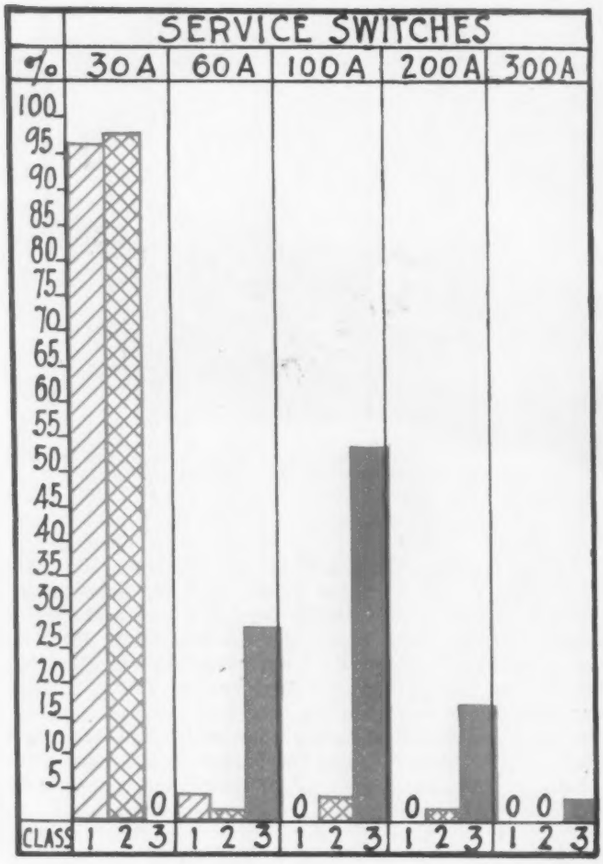
Thus far we have considered only the labor and material increase resulting from Red Seal effort. Have the power companies equal reason to be interested in the Red Seal Plan?

In a recent bulletin issued by F. H. Woodward, general sales manager of the Great Western Power Company, he reports that in 50 Red Seal homes in Oakland the average consumption of electricity over a twelve months period was 516 kw-hr. per month. To quote his own comment: "It looks as if we could use more Red Seal homes."

Last spring the merchandising committee of the Pacific Coast Electrical Association surveyed the energy consumption records of the California power companies and reported a general average for the state of 435 kw-hr. per year per domestic consumer. A survey of over one hundred Red Seal homes which have now been occupied for more than a year shows an average consumption of 429 kw-hr. per month—virtually twelve times as great as the general average shown above.

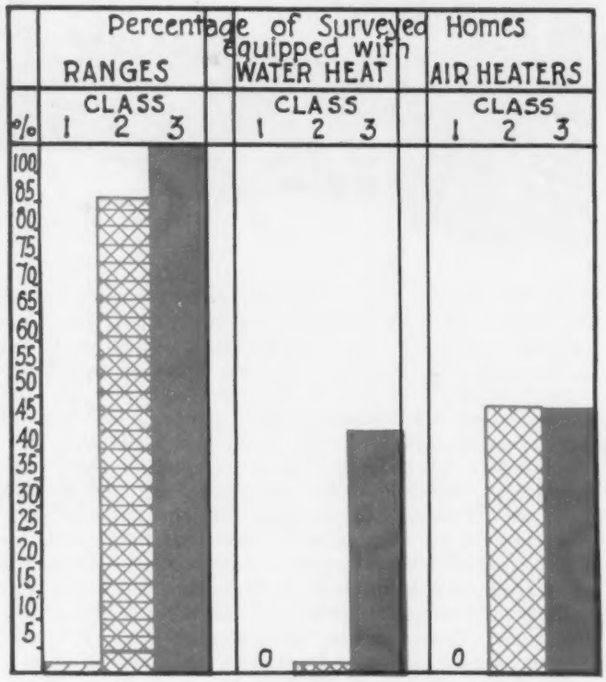






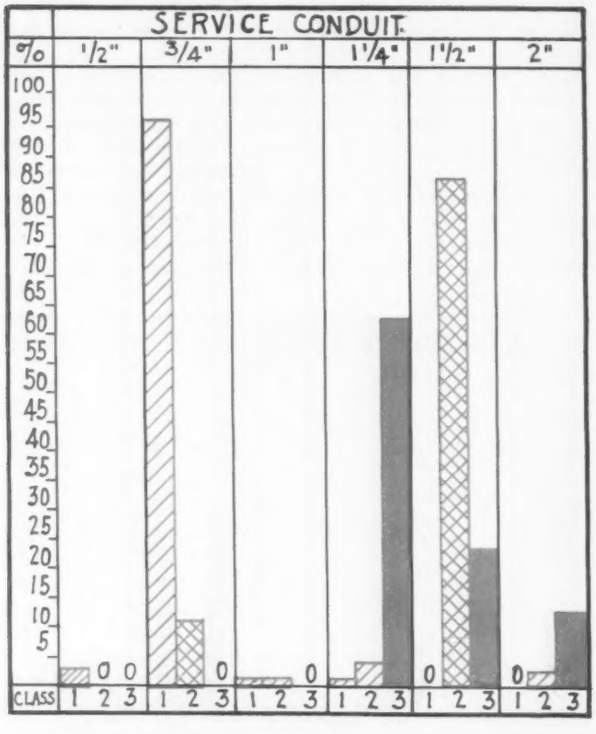
No better picture of the load-building needs of the power companies can be found perhaps than the paper presented at the recent P.C.E.A. convention by H. K. Griffin, chairman of the Commercial Section. Mr. Griffin says, in part, "Twenty-seven per cent of the output from our power houses is used for lighting. This brings in 60 per cent of the total gross revenue. . . . Thus, lighting, including the residential customer, should receive the major attention of our commercial departments." What finer means of building up the domestic lighting load could the commercial departments find than the furtherance of a program resulting in an average increase of 18.7 lighting outlets and 11.9 convenience outlets per home?

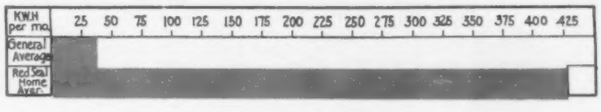
Mr. Griffin further says, "Ninety-five per cent of the people of the state do not enjoy electric ranges. . . .



An electric range will increase the kw-hr. consumption of an average lighting customer five times." In Red Seal homes 82 per cent of the occupants cook electrically and of these 91 per cent purchased their electric ranges new upon moving into their Red Seal homes.

There could be no more appropriate closing for this article than to quote again from Mr. Griffin's paper: "The tremendous growth of the electrical industry of California during the past quarter-century has been influenced by demand; salesmanship has played a very small part in the records achieved by the power companies. But upon the initiative of our commercial men depends the progress of the future. . . . As the power companies grow and progress so does every manufacturer, jobber and contractor-dealer. The power company commercial departments secure new customers and create new demands for power. These load-building activities create a market for the service and products of every branch of the industry." To which the following thought may be added: As the Red Seal Plan grows and progresses so shall that most desirable of all loads for the power company—the domestic load.





Now Let's Sell Electric Ranges

Range manufacturers now offer a type of range to fit every pocketbook and to meet competition from other types of stoves.

AGGRESSIVE selling constitutes the answer to the electric range problem in the opinion of commercial leaders. This article reviews some of the chief sales resistances standing in the way of greater range sales and outlines some of the merchandising policies followed by the successful range merchandisers in the Pacific Northwest.

COOKING has always been the most important detail in the operation of the home. Washing, cleaning and other household tasks may be postponed but the family must eat three meals a day. Despite the increasing popularity of the can opener, the delicatessen store and the cafeteria, preparation of meals in the home still requires the application of heat. If, then, cooking is the most important household task, it would seem that home electrification should have started in the kitchen; more so since in this day of budgeted household expenses, the housewife who finds cooking with electricity is simple and economical should be amenable to further home electrification.

However, lack of foresight on the part of the industry cannot be blamed for the fact that the lamp rather than the range served to introduce electricity into the home. During its early development stages the industry had neither the capacity, facilities, nor the favorable rates to make electric cookery attractive. The opportunity for creating a bond of dependence between the housewife and the light and power industry, possible when domestic electric servants are utilized fully, has only existed for the past ten years. The measure in which this bond has been created has depended upon the selling activities of individual companies in the territories they serve. Certainly, with the exception of a few isolated instances such as in the Pacific Northwest, the possibilities of the electric range have been largely overlooked. With a degree of range saturation of 3 per cent for the country at large, of 6.1 per cent for the Western states and less than 5 per cent for California, it is evident that not even the surface of the electric range market has been scratched. The saturation achieved by Northwestern companies, ranging from 10 to 32 per cent, indicates the possibilities that exist. It is almost axiomatic that the success these companies have enjoyed can be explained in a single word, "selling," and as a corollary that the far less impressive showings that have been made elsewhere can be explained by lack of selling.

Whatever doubt existed as to the desirability of the electric range load should have been dispelled by the N.E.L.A. range survey. Moreover, the data presented in this survey regarding load characteristics provide means for the computation of a cooking rate that should make the electric range profitable to the central station and attractive to the consumer. Should any executive or commercial man still be skeptical, the survey sets up a method of conducting individual tests that would tend to corroborate the statements that the report makes in support of the load. The fact remains that several such independent tests have been conducted and have proved that the installation of a range will double the present load factor of the domestic consumer, will add approximately 1,500 kw-hr. per year to his consumption and from $40 to $60 per year to the revenue derived from that customer.

Granting that the pioneering period for the electric range has passed; that the load is desirable; then the problem today is one of selling.

In the analysis of a selling job it is customary first to consider sales resistances, and in discussing the sale of electric ranges it is not difficult to discover the sales resistances that have impeded progress. Many of these sales resistances have all of the brands and earmarks of sacred cows and like sacred cows they have been revered by the industry to the detriment of range sales. Among these may be listed lack of executive support and interest, particularly in the combination gas and electric companies, apathy of the industry in general, the tendency to offer opinions not founded on fact, particularly by the rank and file, the high cost of installation, and others.

Lack of executive interest and recognition usually has been due to lack of knowledge. The commercial men have not sold their bosses on the electric range. It re-

A Recipe for Selling Electric Ranges

Based Upon the Experience and Recommendations of the West's Most Successful Range Merchandisers

1. There must be a determination to sell not electric ranges alone but the convenience, coolness, cleanliness, simplicity, safety, efficiency and economy of electric cookery.
2. There must be whole-hearted co-operation from the entire electrical industry with every member endorsing electric cooking and as many members as possible using electric ranges in their own homes.
3. There must be executive interest and support, with a thorough understanding of the desirability of the load and the knowledge that during the early stages of the business merchandising profit must be sacrificed for promotional activities.
4. There must be adequate promotional and educational programs directed to both employees and customers with demonstrations, displays, cooking schools, newspaper and direct-mail advertising.
5. There must be a complete selling plan based upon sound merchandising principles.
6. There must be an adequate sales organization comprised of competent directing heads, trained salesmen and trained demonstrators, with a scale of remuneration designed to attract men who are capable of following up prospects and closing sales.
7. There must be continuous sales effort coupled with periodic campaigns to stimulate and maintain interest.
8. There must be a well-equipped service organization whose slogan should be, "A satisfied user is the best advertisement."
9. Finally, there must be a determination to do an aggressive selling job coupled with the realization that, despite the popularity and consumer acceptance that might accrue from advertising, electric ranges will not sell themselves. The companies that today enjoy the greatest degree of range saturation are the most aggressive merchandisers.

mained for the N.E.L.A. range survey to perform this job. However, there are still executives who are inclined to raise their eyebrows and stick their tongues in their cheeks when the subject of electric ranges is brought up in conversation. This is particularly true in the combination companies. The answer to the advocacy of either gas or electric ranges where a company is selling both gas and electricity was expressed by the chief executive of one of these companies recently when he stated that his sales department now told a customer that she had purchased "the best range on the market" irrespective of her choice. No effort was made to sell a housewife a gas range when she asked to look at an electric one, and vice versa, and both gas salesmen and electric salesmen were given an even break on new customers. His motto was, "Let the customer choose."

One of the chief reasons for the slow gain in popularity of the electric range has been the apathetic attitude of the industry in general, and this holds true for other appliances and services as well. Appliances have been advocated that the members themselves were not using. The old maxims that a shoemaker's son goes barefoot and a dressmaker's daughter wears rags certainly have applied to the industry and the electric range. A bald-headed barber makes a poor hair-tonic salesman, and by the same reasoning the electric salesman who, when confronted by a prospective range purchaser asking, "And do you use one yourself?" must answer, "No, but—," might well expect to make no sale.

There are many in the rank and file of the industry who still believe that the electric range is a doubtful cooking medium, slow in operation and expensive to operate. Frequently stories are heard of the wireman, the meter reader or the collector who gives such opinions when asked concerning the electric range. Publicity concerning ranges must be directed at the industry as well as the customers. Surveys should be made to determine the use the industry is making of appliances in its own homes and campaigns conducted to introduce those appliances into those homes. Manufacturers offer attractive prices to central station employees on ranges and it might be well to conduct a range campaign within the ranks of the industry itself. It is not reasonable to expect 50 per cent of the domestic customers to use electric ranges unless 50 per cent of the members of the industry are also users. Publication of electric range information and advertisements should not be confined to newspapers and magazines of general circulation alone; utility house organs should publish electric cooking recipes and other data.

First cost of electric ranges is no longer a sales re-

sistance of importance. Manufacturers have consistently said that as sales volume was achieved the price of ranges would come down, and such has been the case. There are electric ranges on the market today that compare favorably in price with other types of stoves. As for competition with gas ranges, the price differential that formerly existed has been almost completely wiped out since the gas range manufacturers have realized that in order for them to maintain a position in the home as a cooking medium they must offer a better piece of merchandise than they have in the past. The addition of such features as automatic control, white enamel, insulated ovens and enclosed units to make the gas range compare favorably with the electric range has brought the price of the gas product to a point where it is slightly if any less than the electric.

High cost of installation has been and will continue to be one of the major sales resistances, until such time as all new homes are wired for ranges. The Red Seal Plan offers an ideal solution to this problem. Work with architects and builders offers another, but these men cannot be induced to specify electric range wiring until consumer demand has been built up. In Portland 90 per cent of the new homes costing $5,000 or more are wired for a range. Approximately the same percentage of apartment houses are equipped with ranges. But several years of persistent selling have been required to make this condition possible.

The successful range merchandisers in the Northwest all are convinced that the best method of overcoming this item of resistance is to quote a price for the range installed, thereby spreading this cost over the same period as the range purchase contract is to run. They have worked out standard agreements with contractors whereby few installations exceed $40 and the majority are less than this figure. One company has succeeded in convincing the inspection authorities that even a poor range installation has less fire hazard than a coal, gas or wood stove and has brought the cost of wiring below $30.

To solve the problem of selling ranges to families that live in rented homes they suggest that the industry work with inspectors and others charged with the writing of codes in order to secure standards that will permit the use of BX or armored cable that may be removed along with the range when the customer moves. Certainly, lower wiring costs are needed and the task of providing them must be worked out through co-operation between the officials charged with formulating wiring codes, the contractors and the central stations.

None of these sales resistances is so impregnable that it cannot be overcome. The problem of the industry today is to *sell* electric ranges, and in order to bring together the best thoughts on how this selling job might be accomplished some of the experiences and recommendations of the most successful range merchandisers in the Pacific Northwest have been drawn upon. All of these men agree that there is no short cut for achieving range saturation. Persistent and aggressive sales effort must be put forth from the start.

Granting that the commercial man who would get range volume has the interest of his executives and the support of the industry in his territory, they point out that the first requisites are a complete selling plan based upon sound merchandising principles and an adequate sales organization. Under these headings come such questions as term payments, number of salesmen, remuneration of salesmen, relations with dealers and campaigns.

The majority of ranges sold are on terms and the payments run from 12 to 24 months with 18 months contracts the most popular. Initial payments range from $10 down during special campaigns to 25 per cent down. Installation cost is included in the price quoted to the consumer and in the purchase contract although the contractor who installs the range is paid the full price as soon as the installation is completed.

It has been found that from seven to ten salesmen are required to sell 1,000 ranges. Specially trained salesmen are used in the majority of instances although in rural districts sales are made by the regular sales force. Compensation is on a salary and commission basis generally.

Since practically all of the companies have raised the prices to list it is now possible for dealers to handle ranges on a basis that will permit a fair profit. Sales plans should take the dealers into consideration and a co-operative plan, particularly during campaigns, has been found satisfactory. As consumer acceptance is created the dealer will prove to be more and more of a factor and in some cities in the Northwest the household furnishing goods stores are successfully merchandising electric ranges.

The majority of companies have found it advisable to hold two campaigns a year for the purpose of stimulating and maintaining interest, and to secure prospects. Sales effort is not allowed to lag in the meantime, however. During the campaigns, special terms, a slight reduction in price or a premium having a value of not more than $7.50 is offered to induce purchases.

To make the sales plan effective and provide backing for the sales force, there must be an adequate publicity and promotional program directed at employees and customers. No opportunity should be overlooked. All forms of advertising can be used to advantage and special features such as newspaper cooking schools, theater parties and the like have been devised to popularize the range.

Electric cookery has reached a point of perfection that should permit the industry as a body to approach state school superintendents and request that ranges and other appliances be placed in all domestic science classes. The argument that a knowledge of the operation of these appliances is essential in modern housekeeping can be used to induce action. The advertising value of the use of electric ranges by domestic science classes is apparent.

It has been found in the Northwest also that the apartment house containing electric ranges has done much to bring about consumer acceptance. Renters of apartments are frequently home owners of the future and once an electric range is used in the kitchen it is seldom that the housewife will accept some inferior cooking medium.

The entire problem of the success or failure of the industry in bringing greater popularity to the electric range revolves around the question of selling. Certain central stations have demonstrated that ranges can be sold in quantity. Others will measure their success in terms of the aggressive selling efforts expended.

At the present time the residential load carries a larger investment in proportion to revenue than any other field of power company business, and it has been exploited to the least degree. The opinion held by some executives that the domestic customer was a business handicap has undergone a radical change. Today the residential user is recognized as a fruitful source of additional revenue and the electric range is considered as the major appliance to promote this use. The problems that have retarded range sales in the past have been answered and the time has arrived for all new business departments to adopt as their slogan, "Now let's *sell* electric ranges."

Domestic Load-Building

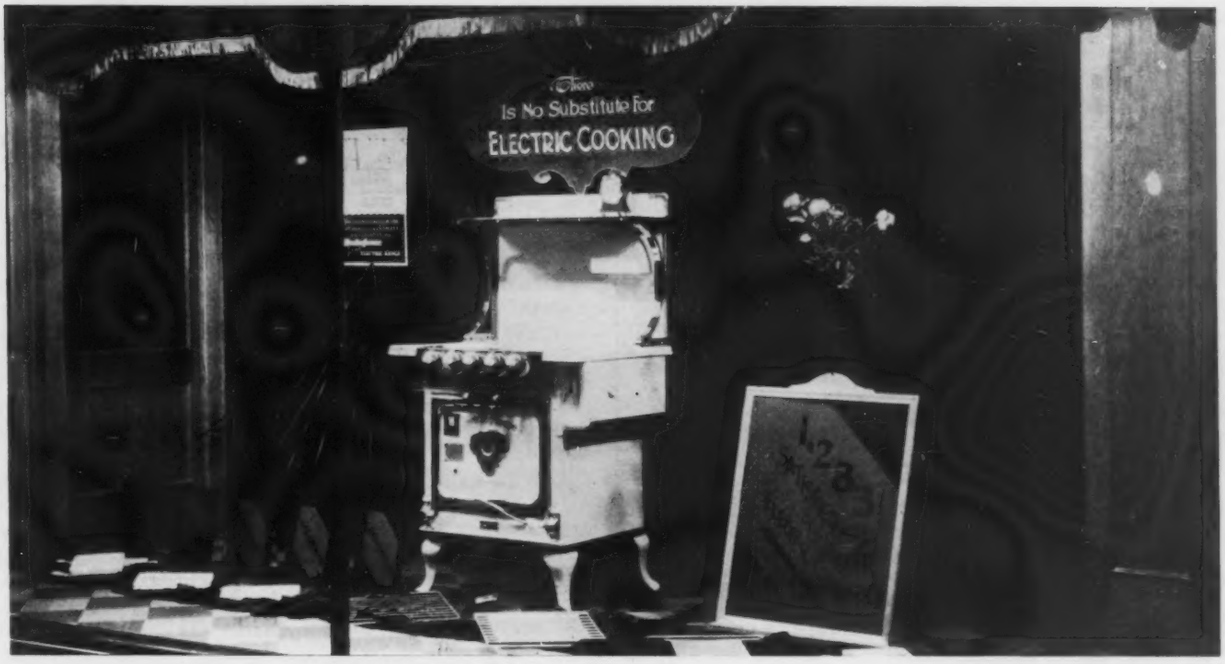
By L. W. BRAINERD
Acting Sales Manager, Idaho Power Company, Boise

SELLING an average of $19.82 worth of electrical merchandise to every residential lighting customer, adding $125,348.75 in estimated annual revenue from the merchandise sold, increasing the average annual consumption per residence customer from 660 to 707 kw-hr., exclusive of water heater use, and raising the range saturation on the system from 27 per cent to 29 per cent, are some of the high lights in the 1926 merchandising results obtained by the Idaho Power Company, Boise. In addition, a net profit on the investment tied up in merchandising activities was recorded, after paying all expenses and charging 6 per cent interest on the capital employed.

Another important feature of the company's merchandising activity is that it has promoted good customer and trade relations. The maintenance of list prices not only has helped to produce a profit at the end of the year but has been a factor in securing co-operation from the dealers in the territory, as is attested by the many letters received from dealers commending the company on its policy and urging a continuation of it.

SUCCESSFUL merchandising methods of a power company faced with the necessity of building load intensively are described in this article detailing the operation of the merchandising plan of the Idaho Power Company in 1926. A steadily increasing residential consumption and an increase in earnings beyond the expectation from normal growth are the prime fruits of a consistent application of this company's policy, and a profit in the merchandising department coupled with evidence of the improvement in customer and trade relations make these fruits the more palatable. These and other features are brought out in the article.

In order to understand the reasons for the merchandising policy and its make-up, it is necessary to understand something about the physical characteristics of the Idaho company's system and its administrative organization. A territory of 15,000 square miles, having a population of 150,000, is served by an interconnected system divided into four divisions. From Pocatello, the headquarters of the division fathest east, to Twin Falls, the headquarters of the next division to the west, is 107 miles. From Twin Falls west to Boise is 114 miles and thence west to Payette is 48 miles. Each of these division centers is surrounded by smaller towns and rural communities and is managed from the division headquarters by the division manager. The sales activities of each division are headed by a division sales manager, and in each division there are from one to five salesmen, with a total of eleven. In addition there are twenty-one local agents who spend part time on sales, whose efforts are figured as the equivalent of seven full-time salesmen, so that with this set-up the company's sales force in the field numbers the equivalent of twenty-two. There are twenty-one company stores. One of the prime reasons back of the company's intensive merchandising activity is found in the fact that the territory served by the company is largely agricultural rather than industrial. It will be understood that a territory deriving a large por-



tion of its income from agricultural pursuits is not susceptible to rapid growth in population nor in agencies for utilizing large blocks of power. Further, the territory is hedged on either side by other utility companies so that the company cannot hope to grow extensively. Thus, if the company is to show more than merely a slight growth from year to year it must develop its possibilities among existing customers, and by intensive cultivation of the existing field, attempt to increase the utilization of electricity per customer. In following out this theory the company has adopted an intensive merchandising policy directed primarily toward its residence customers, and has been able in each of the past six years to show a steady increase in kw-hr. consumption per customer, from 494 in 1920 to 707 1926.

1926 Merchandising Plan

The company has long realized that successful merchandising by a central station depends on three fundamentals: a carefully detailed sales plan must be worked out in advance; employees must be thoroughly familiar with and interested in the plan; and the plan must be followed throughout the year. Consequently, as has been the custom in years past, a definite new business program for 1926 was set up and approved in December, 1925. The plan provided for a special merchandise campaign during each month of the year, and a definite bogie for each of the twenty-one stores. Each campaign was worked out in detail and well in advance, so that advantage might be taken of national advertising and help furnished by manufacturers.

The plan was detailed in a 12-page manual which was mailed at the beginning of the year to all employees concerned with sales. Later a three-day general sales conference was held to examine and explain all details of sales work for the year. This conference was attended by all employees directly interested in sales. Divisional sales conferences were also held, and in this way every employee was acquainted with the year's program. To arouse interest among employees outside the sales department a system of commissions and bonuses during campaigns was devised. For the purpose of maintaining enthusiasm throughout the year frequent sales letters were mailed to all employees, while periodic reports on the sales of each store, comparing results with the bogie for the store, stimulated the competitive spirit.

The advertising allowance based upon estimated sales was budgeted at the beginning of the year and the appropriation was divided among newspapers and posterboards in the territory so as to reach the largest number of customers and do the greatest good. Local advertising was made to co-ordinate with national advertising in so far as was possible, and use was made of broadsides and other forms of advertising furnished by manufacturers and jobbers so that the local advertising effort was amplified with good effect.

Contractor-dealers were notified in advance of campaigns that they might tie in with the activity. Wherever advisable the company assisted contractor-dealers to finance time-payment sales.

Campaigns

The campaigns scheduled and carried out in 1926 were as follows:

January—Clearance sale, vacuum cleaners, commercial lighting units.

February—Kitchen lighting units.

March—Ironing machines.

April—Washing machines.

May to September, inclusive—Ranges, water heaters, refrigerators, fans.

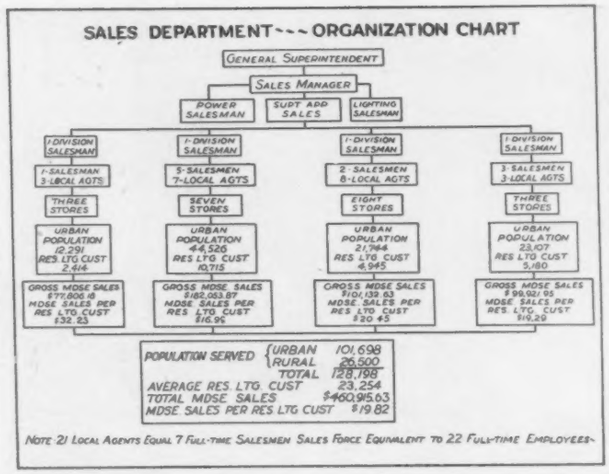
October—Washing machines.

November—Ironing machines, vacuum cleaners.

December—Christmas appliances.

In addition to monthly campaigns, a continuous campaign on all table appliances was run in all company stores. Practically every month a leader was used on which to concentrate, these leaders being chosen to tie in with the monthly appliance sales suggested in the N.E.L.A. merchandising schedule. Each store was advised in advance of the newspaper advertising to be done so that a complete tie-in could be effected.

The merchandising program also provided for the sale of lamps throughout the year with special effort to be



applied in the fall and winter months. During these months, employees other than salesmen were offered a commission for selling lamps, with the result that many empty sockets were filled during this period and lamp sales for the year were highly satisfactory. A bogie of $1 per lighting customer was set up as a mark to shoot at in selling lamps. This was actually exceeded and at the end of the year had reached $1.15 per lighting customer.

Bogies

The merchandise sales bogie for the year was fixed at $446,500, being figured on the basis of $20 per residence lighting customer, using the average number of such customers carried on the books of the company during 1925. This was $3.64 per customer higher than the actual average annual merchandise sales per residence customer for the four years previous, which was $16.36. It was necessary also to set a bogie on the number of each major appliance to be campaigned, and to divide this into bogies for each town in each division based on the relative number of residence customers in those towns. The gross selling price of these appliances plus the $1 per lighting customer in lamp sales plus the selling price of the expected sales in miscellaneous small appliances equaled the total merchandise sales bogie.

The bogie in the number of major appliances on which campaigns were to be conducted was set as follows:

Kitchen lighting units	1,130
Washing machines	1,317
Ranges	1,500
Water heaters	643
Refrigerators	140
Ironers	157
Vacuum cleaners	442
Commercial lighting units	560

As has been stated these totals were divided as between divisions, and further as between towns in divisions based on the number of residence customers in those divisions and towns. A further bogie set up was that in estimated annual revenue to be derived from the merchandise sold and used on the lines. It was figured that the above major appliances would yield an annual revenue of $98,130, and that $5,000 could be expected as revenue from miscellaneous appliances sold, which calculation produced the figure of $103,130 as the total bogie in estimated annual revenue.

Typical Campaigns—Washers

A brief description of some of the campaigns will indicate how all of them were planned and carried out. The spring campaign on Automatic washers was scheduled to run from March 29 to May 3. The only inducement offered was in the exceptionally easy terms of $1 down and $5 per month for a new and improved model of the Automatic. Besides newspaper advertising prepared to run in all the papers in the territory during the campaign, various other forms were utilized. To start the campaign off properly, broadsides were included with the April 1 bills, while the bills themselves carried an advertisement on their backs and an announcement was made in a red blazer on the backs of the envelopes in which they were mailed. Window trimming equipment and store banners were supplied to each of the stores, and automobile signs were used on all company cars. Employees wore buttons in their lapels.

As a publicity stunt and a means of securing prospects, a supply of caps and whistles was provided for distribution at the start of the campaign to every school boy and girl that could give the name of a prospect. To induce them to furnish bona-fide prospects, the company agreed to pay a dollar for every prospect so received that was sold during the campaign.

A bogie of 425 machines was established for all divisions, and to stimulate competition between divisions this was divided into proportionate numbers for the various towns. Employees outside the regular sales force were offered a commission on sales graduated upward so that the more sales made by any one employee the greater his commission per machine sold. Employees were provided with sales arguments and facts of interest about the machine and the numbers in use in their towns. Interest was kept up throughout the campaign by a series of letters sent to each employee in which the campaign was depicted as a foot race with the divisions as contestants. These were issued every three or four days and showed the standing of the divisions by towns and indicated the percentage of bogie sold in each. The final result was that 484 machines, or 114 per cent of bogie, were sold. Payette was high town with 263 per cent, and the Payette division won with 220 per cent.

Range Campaign

Two range campaigns were scheduled during the year, one featuring Hotpoint ranges from May 3 to June 14, and one featuring Westinghouse ranges from June 14 to July 24. In each campaign a particularly all-round, suitable model was chosen as a leader and featured in the advertising, to be sold on terms of $1 down and $5 per month, and all other ranges could be had for $5 down with twenty-four months in which to complete payment. No other inducement was offered to purchasers. Newspaper advertising, window displays, store and automobile banners were the principal advertising media used.

Again, all employees were invited and urged to participate in the campaign activities through offering a commission on sales made and prospects turned in, and in addition an extra bonus was offered in each case.

The Hotpoint campaign was organized as an automobile race, in which divisions competed against each other on the basis of the percentage of their bogies sold. The bonus was offered in the form of increased commission, as follows: 40 per cent in the division making the highest percentage, 30 per cent in the division coming second, 20 per cent for the third, and 10 per cent for the fouth, though to secure this bonus the division

had to equal its bogie. In the Westinghouse campaign, the twenty towns were opposed to each other in ten pairs, taking towns of approximately the same number of residential customers to compete against each other to see which would make the highest percentage of bogie. An extra commission of $1 per range was offered to the winning town in each pair.

In the Hotpoint campaign the bogie established was 303. All divisions made their individual bogies and a total of 364 were sold. Against a bogie of 300 in the Westinghouse campaign, 342 were sold. The Payette division was the leader in both campaigns. It might be said in partial explanation that the Payette is the smallest division, and that a higher percentage of all its merchandise sales is made by employees outside the sales force than in any other division. This brings out the point that in the larger towns an employee's work is more specialized and he is less apt to become interested in lines of endeavor outside his own specialty than the employee of the small town, whose work is more diversified. Further, it emphasizes the fact that results can be obtained by offering commissions and prizes or other inducements to employees outside the sales force, and by introducing the "game" element into campaigns so that employee will compete with employee, town with town, and division with division.

Results Compared with Bogies

These campaigns and others somewhat similar on other appliances contributed largely to the sale for the year of $460,914.63 worth of merchandise, which amounted to $19.82 per residential customer, using the average number of such customers carried during the year. The total kw. load added by the sale of this merchandise amounted to 10,121.9, which it is estimated will yield $125,348.75 in annual revenue. Both these figures exceed by substantial amounts the bogies set at the beginning of the year.

In a few instances the bogies set for sales of certain appliances were not quite reached, as for instance, out of an expected 1,500 ranges only 1,335, or 89 per cent, were sold. In this department of the merchandising activity the Payette division was high with 137 per cent, and won the silver cup offered at the beginning of the year. The Twin Falls division also reached bogie but the Pocatello and Boise divisions fell below. The ranges sold amounted to 8 per cent of the remaining customers not using ranges at the beginning of the year, and raised the percentage of range users on the system from 27 to 29 per cent. It is interesting to note that in the two divisions showing the highest percentage of sales in 1926 there exists also the highest percentage of saturation, the Twin Falls division showing 35 per cent and the Payette division 33 per cent. This appears to indicate that high saturation not only is not a deterrent to further sales, but on the other hand that it may be a stimulus.

Interior of Boise Store

Increased Consumption and Profits

One of the outstanding good effects of the definite and aggressive merchandising program of the company, which has been in effect for some years, is evidenced by the steady increase in residential consumption in the past seven years. This has been as follows:

	Average No. Residential Customers	Kw-hr. Used	Average per Customer
1920	21,203	10,420,027	494
1921	21,590	11,964,095	556
1922	21,577	12,678,122	590
1923	21,544	13,238,237	616
1924	21,590	13,396,579	610
1925	22,325	14,724,551	660
1926	23,254	16,433,692	707

In this tabulation only the consumption for lighting and cooking has been taken into consideration. Had the calculation included also the 20,685,768 kw-hr. used in 1926 by the 4,048 water heater customers, the average consumption per residence customer would have been 1,596 kw-hr. instead of 707.

A word should be said about the bookkeeping methods employed since it has been stated above that a net profit was made in the merchandise department. A thorough record of costs is kept and it is believed all items of expense were cared for in computing the final results. The cost of labor and material, including such items as installation costs, transportation and warehouse expense, and inventory shrinkage, was 72 per cent of the gross sales less adjustments. Commercial expense of 13 per cent included salesroom rental and window lighting as well as salesmen's salaries, commissions and expenses, advertising and demonstration. Accounting and collection expense, including uncollectible accounts written off, was 2 per cent. General expense, amounting to 4 per cent, included salaries of general office sales and accounting executives, insurance and taxes on stock, and miscellaneous. In addition, 6 per cent interest charged on average accounts receivable, average monthly investment in merchandise stock and in store fixtures and equipment, amounted to an additional 5 per cent of the gross, leaving as net profit about 4 per cent of gross. This, in fact, amounted to 5.27 per cent on the capital employed in merchandising, consisting of the three items, merchandise stock, accounts receivable, and store fixtures and equipment.

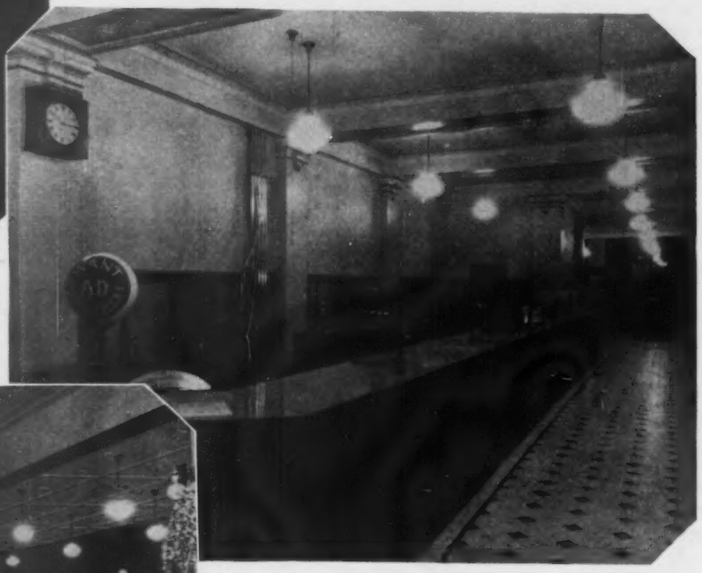
An interesting commentary on the final results is that the rate of turnover, being the cost of the goods sold plus the cost of the job orders divided by the average investment in merchandise stock, was only 2.25. This might well be higher under more favorable distribution conditions, since the company must maintain a larger merchandise stock than is ordinarily considered good practice due to the fact that there are no jobbers in the territory. Boise lies some distance from the Portland, Spokane and Salt Lake jobbing territories, and this remoteness of jobbers' stocks means that purchases in Boise must necessarily be in larger quantities to assure an ample supply being on hand for maximum results. The same gross results in a locality more favorably situated with respect to the jobbing situation would produce a greater turnover and a higher percentage profit on the capital employed, since the investment in merchandise stock could be kept down.

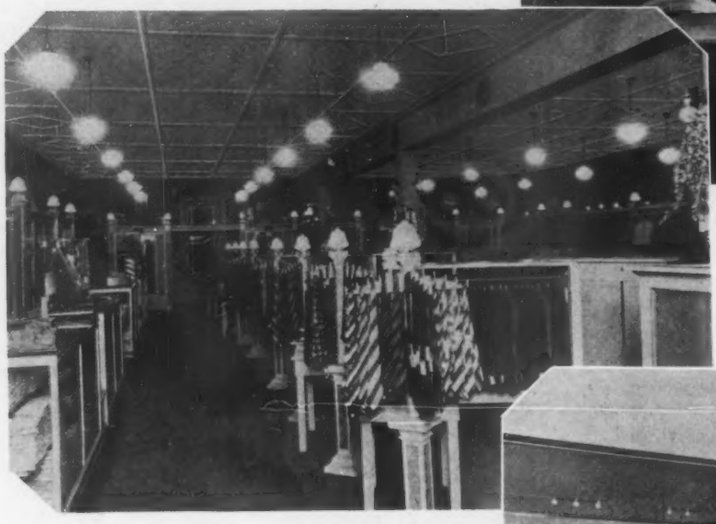
Accomplishments

Attributable to the Work of the

TO THE contractor the Lighting Service Bureau, with headquarters in Salt Lake City, Utah, functions as a clearing house for information, where specifications for lighting can be drawn up and submitted to a prospective customer. To the general public its services in helping them solve their lighting problems are offered free. To the Utah Power & Light Company, whose lighting service department acts as the bureau's engineering staff, it means load building. To the lamp companies, a representative of each composing a supervisory committee, it means the development of business. To Salt Lake City it has meant added attractiveness due to flood lighting, store and office illumination, better-lighted homes and a capable handling of special event lighting.

Beginning with one man the staff of the bureau now consists of five. Men of the staff stimulate floodlighting in both city and outlying districts, special lighting for pageants, fairs, commercial, industrial and window lighting.





Residential lighting work is done effectively by a woman. She has interviewed 60 per cent of the builders of new residences in 1926. She secures floor plans and has lighting and convenience outlet suggestions plotted on them, discussing them with the housewife. An average of 6 outlets has been added to 172 homes.

The report for 1926 shows 205 commercial, industrial and floodlighting plans submitted (6,580 lighting outlets) of which contractors completed 122 (5,040 outlets). This represented a cost of wiring and fixtures to the consumer of $35,280. The average number of plans per month was 17, of which 10 were closed. The average of lighting outlets per job completed was 41, with an average wiring and fixture cost of $288. These figures do not include switches, wall plug receptacles or any outlets except those equipped with a lighting fixture. Downtown people are said to be appreciating more and more the value of light, correctly applied, in helping business. In this type of work the customer is better able to see the direct commercial advantages to be derived.

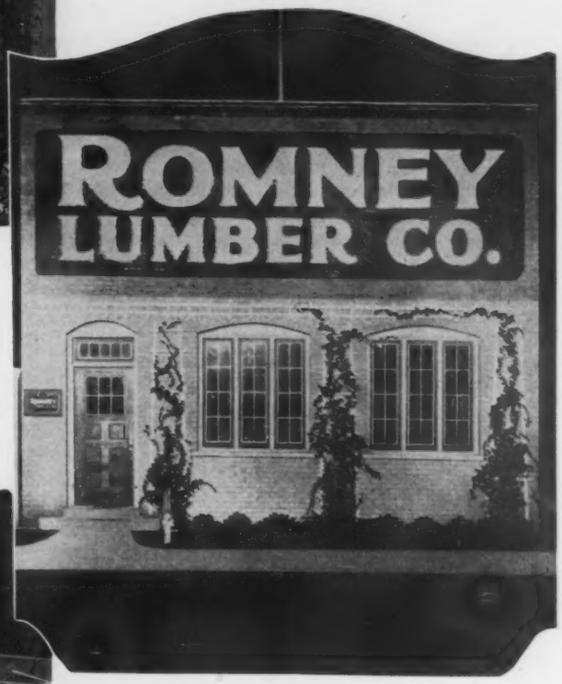
in LIGHTING

Salt Lake Lighting Service Bureau

In its residential lighting activity during 1926 the bureau made plans and specifications for 124 residences of from $5,000 to $10,500 in value, adding a total of 1,056 outlets and increasing wiring to the extent of $2,092, an average increase per house of $16.87. The outlets included in these figures are switches, wall plug receptacles, wall brackets and ceiling lights. Special purpose outlets such as range, ironer, radio, telephone, not included.

With respect to apartment houses this work has been effective. One apartment house was sold a very high-class wiring job and every job following this has used that partciular building as a model, so far as wiring is concerned. Window lighting, too, has improved. Last year the increase in revenue from this source alone was 41 per cent over that for the previous year.

The illustrations on these two pages show typical installations resulting from the efforts of the lighting service bureau. On page 210 are examples first of downtown building floodlighting, next of lighting installations in a newspaper office and a haberdasherie, and at the bottom of the page, lighting in a billiard room. On page 211 are examples of window lighting, special lighting for a pageant and two examples of floodlighting of commercial buildings in outlying business districts. Residential examples were not available.



Increased business for the contractor-dealer results, of course, and all branches of the industry profit. But public reaction is the most important testimony as to the value of the bureau's work. Expressions of appreciation from customers are numerous because the chief value lies in the fact that suggestions are offered which will add to the convenience and comfort of homes and to the efficiency of offices as well as to the attractiveness and desirability of stores, buildings or the products handled by them. Plans are now under way for the conduct of lectures on lighting and illumination, similar to those conducted last year on the Pacific Coast.

Delivery trucks of an ice company not only displaying banners advertising refrigeration but also advertising electric refrigerators.

Portland S

AFTER nearly a year of existence, the Portland Refrigeration Trades Association can look back on a series of constructive promotional activities and can commence to count commensurate results. Formed in October, 1926, by seven dealers and distributors of electrically-driven mechanical plants, the association has been expanded to include also distributors of gas-heated absorption machines, ice manufacturers, ice delivery companies, ice box manufacturers and manufacturers' agents, and dealers in ice boxes, until now the membership numbers forty-five.

The formation of the association was predicated on a recognition by a few leaders of the industry in Portland of the fact that an understanding of the value of refrigeration to the homes was very limited in the territory, and that business for all could be substantially bettered if the comparatively small percentage of then existing prospects could be materially increased. Such expansion of the field of prospects, it was thought by these far-seeing leaders, could best be effected by utilizing co-operatively a portion of each individual advertising appropriation for educating the public at large to the importance of refrigeration as a factor in modern housekeeping. In other words, it was recognized that the greatest resistance to be overcome was the resistance growing out of ignorance of the facts underlying the principle of preserving food by refrigeration; that the obvious corrective measure for this condition was education; and that general educational promotion could be carried on better co-operatively than individually.

In addition, the leaders realized that unethical practices had developed in other territories creating unstable and unsatisfactory conditions in the industry. It was thought that occasional frank discussion of problems by those in the business might prevent unethical advertising and sales methods, price cutting, and other evils that had prevailed elsewhere to the detriment of profits. Thus it was argued that if the interested concerns could be brought together periodically into a common meeting place, the individuals would come to know each other better, differences of opinion could be ironed out, advertising ideas and sales methods could be discussed and, in a measure, standardized, and co-operative promotional activities could be worked out. These, then, were the ideas back of the formation of the association, which has now functioned for about a year carrying out its ideals with a noticeable improvement in conditions in the territory. Weekly luncheons have been a feature of the association's activities.

Educational Talks Broadcast

The first promotional activity determined upon, after the organization had been effected and the weekly luncheons had been started, was to broadcast over the radio a series of talks on refrigeration. A period of fifteen minutes between 1:30 and 2 p.m. on a certain day each week was secured for presenting these talks. The subjects of the talks were confined to general material, beginning with the history of refrigeration from earliest times to the present. This was followed by talks on the causes of food decay, scientific facts about bacteria growth and the temperatures necessary to minimize this growth, the effects on food of keeping it refrigerated and the relation of food deterioration to health, the necessity for year-round refrigeration, and the future possibilities of electric refrigeration. During this period of the association's existence, its membership was confined to dealers in electrical refrigeration machines including two ice companies selling a mechanical unit as an adjunct to the ice business. In addition to the educational talks, a Sunday evening concert program was sponsored by the association.

The association's next activity was concentrated into what was termed a Refrigeration Educational Campaign, a broadly conceived advertising program believed to be the most ambitious of its kind yet attempted on the Pacific Coast. This program was designed to put across to the community the idea embodied in the slogan,

Sells Refrigeration

Ice manufacturers, power companies, the gas company, mechanical refrigeration agents and dealers, furniture and department stores in Portland have combined in a co-operative effort to sell refrigeration. A survey shows how successful these efforts have been.

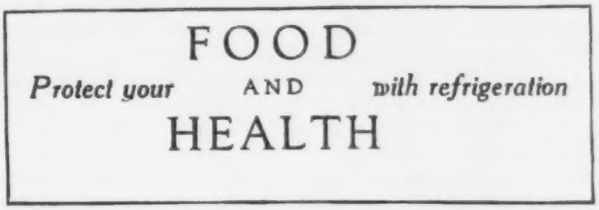
"Protect Your Food and Health with Refrigeration," and in order to make the effort community-wide it was necessary to secure the co-operation of all interests dealing in refrigeration of any sort. Thus this campaign was made the vehicle for interesting other allied trades, as the ice delivery companies and ice box manufacturers and dealers, in the association, and it was at this time that the membership was expanded to include all such dealers. Little difficulty was experienced in enlisting in the movement a large majority of the dealers affected. A summary of the firms entering the campaign is as follows:

Furniture Stores	9	Power Companies	2
Department Stores	2	Ice Manufacturers and Distributors	11
Mechanical Refrigeration Agents	5	Gas Companies	1
Dairies	9	Ice Box Manufacturers	7

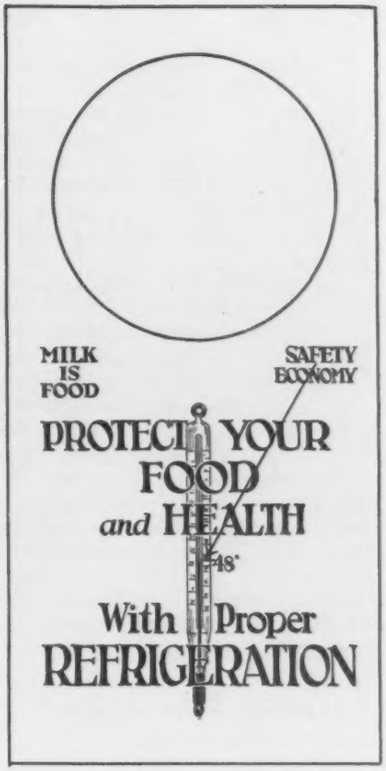
Refrigeration Educational Campaign

The campaign was set to run for ten days in May. All the co-operative advertising was general in character carrying only the simple message of the adopted slogan without firm name or product being mentioned, but it was understood that each individual firm would make this campaign period the occasion for special advertising of its own particular product or device for rendering refrigeration service.

The campaign message was broadcast throughout the city by a number of simple and inexpensive media. About 250 banners carrying the slogan were placed on the delivery and service trucks of the participating firms. These included seventy-five ice delivery trucks, thirty trucks of the furniture and department stores, and twenty-four power company service trucks. In addition 400 poster cards were provided for display in the windows and the stores of the participants. Further expansion of the idea was made possible by the Portland Electric Power Company, which donated street car advertising space valued at $800 for 450 car cards. Also the Northwestern Electric Company attached 26,000 stickers to the power bills sent out during the period of the campaign.



The Northwestern Electric Company attached this sticker to every bill sent out during Refrigeration Week.



Nine Portland dairies attached this card to every bottle of milk delivered in the city during a refrigeration campaign.

An additional medium for spreading the message was found in enlisting the support of the dairies. Although these firms had no refrigeration to sell, they readily recognized the value to the service they rendered of adequate refrigeration in the home, and nine companies delivering a large percentage of the city's milk consumption attached the message to every bottle delivered during one week. A card with a convenient hole for slipping over the neck of a milk bottle was provided for this purpose.

To defray the cost of this general advertising, with the exception of truck banners, the participating firms were assessed from $5 to $25 in accordance with the size of the business. Each firm using truck banners provided them at its own expense.

Incidental to the paid advertising, but by no means inconsequential in importance in spreading the message, was the amount of free space given to the campaign in the editorial, news and feature columns of the daily newspapers. The campaign itself had news value, and the scientific and health features involved made excellent copy for the domestic science and women's page editors. This phase of the campaign publicity was in charge of a publicity expert.

Health Authorities a Factor

Another feature of the campaign publicity was the series of talks given by state and city health authorities and by domestic science experts and instructors from the University of Oregon and the Oregon Agricultural College. These talks dealt with the scientific principle of refrigeration in its effect on bacteria growth and its relation to food preservation and health protection. They were delivered before twenty-eight civic bodies and luncheon clubs, including the Portland Chamber of Commerce, and before a total of 3,200 women in various women's clubs and parent-teachers'

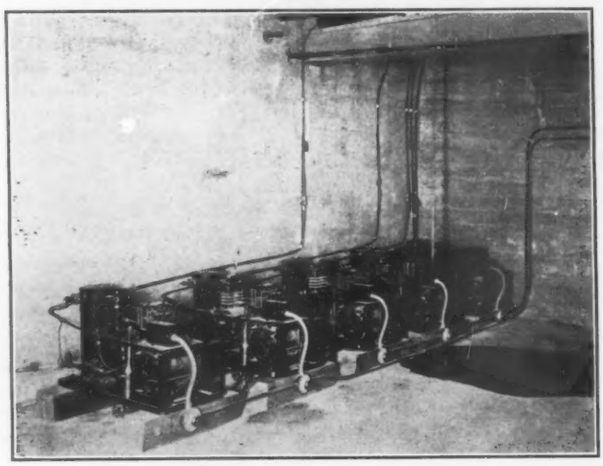
associations. Also at high schools and colleges short courses were given in food preservation for the benefit of domestic science students. In addition, three lectures were broadcast over radio. The fact that the cooperation of the health authorities was thus so readily obtained indicates the importance such authorities attach to refrigeration as a necessary aid to community health, and the cordial reception accorded the talks by the organizations before which they were delivered indicates the general interest that can be aroused in the subject.

In fact this method of spreading the idea is considered to be so effective that it has been decided to employ it further in an attack on one of the main problems now facing the association. Plans are being effected to place a speaker before women's clubs, doctors' meetings, and architects', contractors' and builders' associations through the winter months, stressing the need for year-round refrigeration in an effort to offset the customary seasonal slump and to create receptivity to the idea of refrigeration in winter. Another problem receiving attention in the councils of the association is the problem of how best to combat the generally prevailing idea that the cold cupboard, or the so-called "California cooler," is adequate refrigeration. In short, effort in the immediate future is to be directed toward solving specific problems.

Results Achieved

As nearly as can be estimated, the business in mechanical refrigeration for the first eight months of 1927 in Portland and the immediate environs has reached a total of approximately 2,050 frost tanks or coils installed. This may be divided as follows: apartments, 1,050; residential, 400; and commercial (including ice cream cabinets), 600. It should be understood that the figure for apartments is fairly accurate, and that the number of apartments refrigerated is used, not the number of buildings nor the number of compressor units installed in those buildings. The figures for commercial and residential installations cover compressors and are approximate. Generally speaking, this total is running below quotas established for the year by manufacturers, and is considered not entirely satisfactory particularly in the residential field.

In the case of apartment installations it is significant to note that slightly over 700 of the total of 1,050, were installations in new apartment buildings and that this represents over 90 per cent of the total number of such new apartments built in Portland since the first of the year. The other 300 odd apartments refrigerated were in old buildings, whose owners sensed the necessity of modernizing them so as to put them on an equal competitive basis with the new ones being placed in service. By far the greater number of buildings installing refrigeration used the multiple system of connecting several frost coils or tanks to one compressor with the battery of compressors installed in the basement. A very few installed a brine-circulating system.



An installation of compressors in the President Court Apartments, Portland, supplying service to coils in the various individual apartments. Ninety per cent of the new apartments in Portland are equipped with electric refrigeration.

A commercial installation in the Multonomah Club at Portland. Over 600 commercial refrigeration applications were made during the first eight months of 1927.

It should be pointed out that the impetus toward mechanical refrigeration in apartments in Portland began in 1926 when there occurred a considerable activity in apartment building, and when, also, a high percentage of the new buildings installed refrigeration. The tightening of money for loans on this class of real estate development early in the summer of 1927 acted as a deterrent to continued activity in this field, or the sales of refrigeration in the territory would have been much greater. It is safe to assume that when apartment building again resumes in Portland, the refrigeration interests will have little difficulty in selling the owners practically 100 per cent, since conceivably no owner would attempt to place in the field a modern apartment house without this great housekeeping convenience, in competition with so many apartments now possessing it.

There is little doubt that the educational work done by the Portland association has had a beneficial effect on business, and that it has paved the way for the more intensive selling that must be done to secure business. Further, it seems true that competitive conditions within the trade in Portland are in a healthy condition as compared with some other localities. An interesting side-light on the effect of the promotion of mechanical refrigeration and refrigeration in general in the Portland territory, is that ice box dealers and ice companies report an increase in business, which simply means that the idea gradually is taking hold, and that a number of new prospects for mechanical refrigeration is being built up for the future.

Radio for Load-Building

Trend Toward Power-Operated Equipment Makes Radio Load-Building a Factor Not to Be Overlooked

THE power company man who seriously studied the radio shows of the country this year must have been impressed with the fact that the radio receiver is fast taking its place as a household current-consuming device and as such belongs as much in the power company picture as the electric range or the washing machine. The actual amount of current used per hour in its operation is not large for any one unit, but considering the great popularity of radio and the widespread possession of equipment, plus the rather high average of hours of use per day, the converting of the radio fan into a power consumer means a return to the power company of no mean proportions. It is figured, for instance, that the New York Edison Company receives an annual income from radio alone amounting to about $1,000,000. This is exclusive of the increased light bills resulting from the late hours kept by radio fans.

The Chicago radio show this year showed 29 per cent of the sets utilizing a.c. tubes and 4 per cent with battery eliminators built into the set. The remaining 67 per cent allowed of either battery or socket power connections. In San Francisco, a month or so later, the number of socket power operated sets was even greater. According to figures compiled by W. P. Bear of the Pacific Gas and Electric Company, only 5 sets were displayed which called for battery operation exclusively.

He counted 143 sets which could be used with either type of power and 66 (about 30 per cent) which operated exclusively on raw alternating current. The exact figures are as follows:

Radio Sets at the San Francisco Show

	Number Displayed	Per Cent
Using either batteries or eliminators	143	65.0
Using power packs only	6	2.7
Using either batteries or eliminators	143	65.0
Using a.c. power exclusively	66	30.0

Undoubtedly the surprise figure in this tabulation to most people will be the number of sets using alternating current tubes. Whether this percentage would be maintained in the sets on display in dealers' shops, or in use in the homes, is of course questionable; but that the emphasis at the show was undoubtedly on this feature is a signboard for the future and it is safe to predict an increasing list in this direction during the coming year.

Parallel with this developing interest in sets designed for direct operation from power lines is the declining emphasis on batteries. Dry batteries still are in use of course, but they have unquestionably ceased to occupy the center of the picture, as has also the acid battery for A service without the charger. The acid A battery for use with a power unit was fairly well represented in sets on display in the San Francisco show, but undoubtedly the dry rectifier unit was the type most favored. This brings the battery operated set also into the field of power company interest as a potential current consumer. Mr. Bear's figures on socket power devices on display at the San Francisco show are as follows:

	Number on Display	Per Cent
A power units	29	23.0
B eliminators	51	40.5
BC eliminators	4	3.2
B eliminators and amplifiers	5	4.0
A and B power combined	35	27.7
Amplifiers only	2	1.6

Although there are continued rumors of wired radio and of other innovations of a revolutionary character, there is nothing apparent on the horizon at the present time which would indicate any radical change in the radio industry for the near future. Most of the speculation is in the same class with the distribution of power by wireless and is only considered seriously at the present time because the phenomenal growth of radio itself has suggested the plausibility of miracles. There are those who pessimistically predict a decline in public interest now the novelty of radio reception has worn off. Undoubtedly there has been and will continue to be a decline in the front page news value of wireless transmission, which is sinking into one of the accepted commonplaces of the age, but this does not in any way mean a decline in the purchasing of radio equipment. Every indication is that the public's attitude is becoming standardized and stabilized and that, with the boom stage past, that of steady growth has set in.

Many of the power companies of the Pacific Coast are well aware of the importance of household radio as a future builder of domestic load and most of them are actively encouraging the movements which make for the bettering of conditions within the radio industry. With one or two exceptions, they are not merchandising radio equipment. Possibly as much as 1 per cent of radio sales at the present time pass through power company channels. What the attitude of the individual power company should be toward this phenomenon among infant industries is, of course, a matter for its management to decide, but certainly the present-day trend toward power operated equipment and the firm place which radio holds in the public regard give it a potential load-building significance which cannot be overlooked.

A country-wide survey recently made through the medium of the newspapers in 600 small towns attempted to get a picture of the type of sets now being sold through dealer channels. Of the retail firms answering the questionnaire, 479 stated that batteries were still favored by the public in their purchasing; 105 dealers reported that sets operated from house current were the most popular; 98 said that the use of house current was coming in and that this would soon be the favored class; 11 considered the demand for battery and for power operated sets about even.

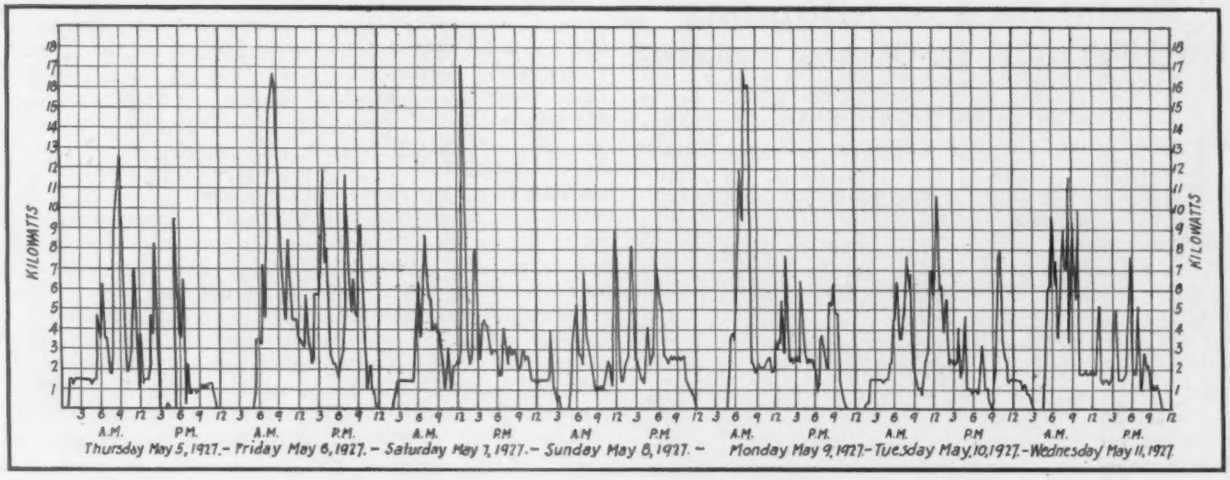
A periodic review of business conditions in the radio industry on the Pacific Coast reveals a sustained interest in battery eliminators, with the self-contained power operated set using house current direct as the coming attraction. Month after month "power operated equipment" is reported by dealer and wholesaler alike as the featured article in buying. One dealer reports that in one month 80 per cent of his sales were in power-operated sets.

Not only is the radio set coming more and more to be a house current operated device, but it is constantly increasing in the number of tubes used and in consequence in the current consumed per unit.

Again to quote Mr. Bear's analysis, whereas in 1925 the average of tubes for the sets displayed in the radio show of that year was 3.8 and in 1926 it was 5.6, in 1927 the number had risen to 6.26. The cost of sets, which is available over a longer period, is indicative of the same trend.

Average Price of Radio Sets

Year	Stripped	Complete
1923	$ 16.00	$ 46.00
1924	50.00	100.00
1925	100.00	175.00
1926	122.00	197.00
1927		272.00


KILOWATTS
A.M. P.M. A.M. P.M. A.M. P.M. A.M. P.M. A.M. P.M. A.M. P.M. A.M. P.M.
Thursday May 5, 1927.- Friday May 6, 1927. - Saturday May 7, 1927.- Sunday May 8, 1927. - Monday May 9, 1927.- Tuesday May 10, 1927.- Wednesday May 11, 1927.

Water heater demand curve for ten consumers at San Joaquin, Calif., with total water heater load of 42 kw. The maximum peak of approximately 17 kw. occurs between 6 and 9 a.m. except on Saturdays. The diversity for water heaters alone is 2.5

Water Heater Load Characteristics

By H. K. Griffin

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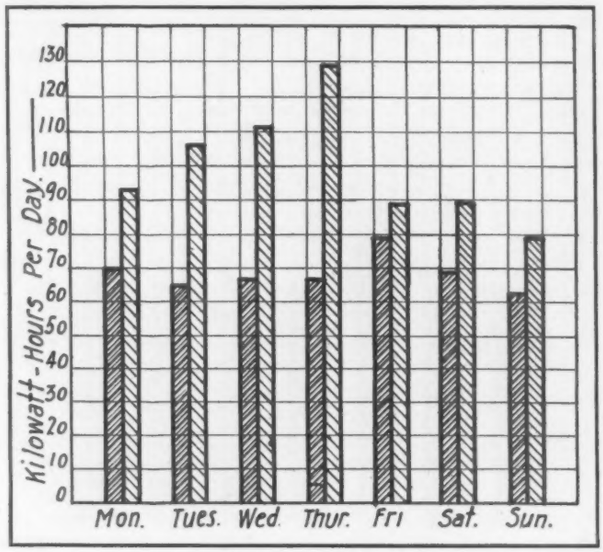
THE DESIRABILITY of a comprehensive test of electrical water heating has been much discussed in recent years, but more particularly since the completion of the electric range survey made in the Pacific Northwest by a special committe of the N.E.L.A., during the years 1924, 1925 and 1926. It was the recommendation of this committee that such a test be carried on in California, due to the prevalence of large size heaters on metered service, and a larger degree of saturation than any similar location in the United States.

In the fall of 1926 a separate water heating committee was appointed in the Commercial Section of the National Electric Light Association for the sole purpose of undertaking a water heater survey.

At a meeting of the committee held in San Francisco, in February, 1927, it was decided that the primary data desired was about as follows:

1. The average monthly kw-hr. consumption per water heater.
2. Diversity of water-heating load.
   a. Charts giving load characteristics of a group of water heaters segregated as to the types of installations and sizes of heaters.
   b. Obtain answers to a questionnaire as to the living conditions of the family occupying each home under test, and its reaction to electric water heating.
3. Relation of average water-heater peak to system peak.
4. Charts giving the load characteristics, segregated as listed below, on the same installation for each of three types of heaters, and the average of ten installations.
   a. Water-heater load.
   b. Range load.
   c. Total load of home under test.
5. Rates for each installation tested.
6. Investigate the possibility of using apartment house installations for a group study of hot water consumption and other characteristics.



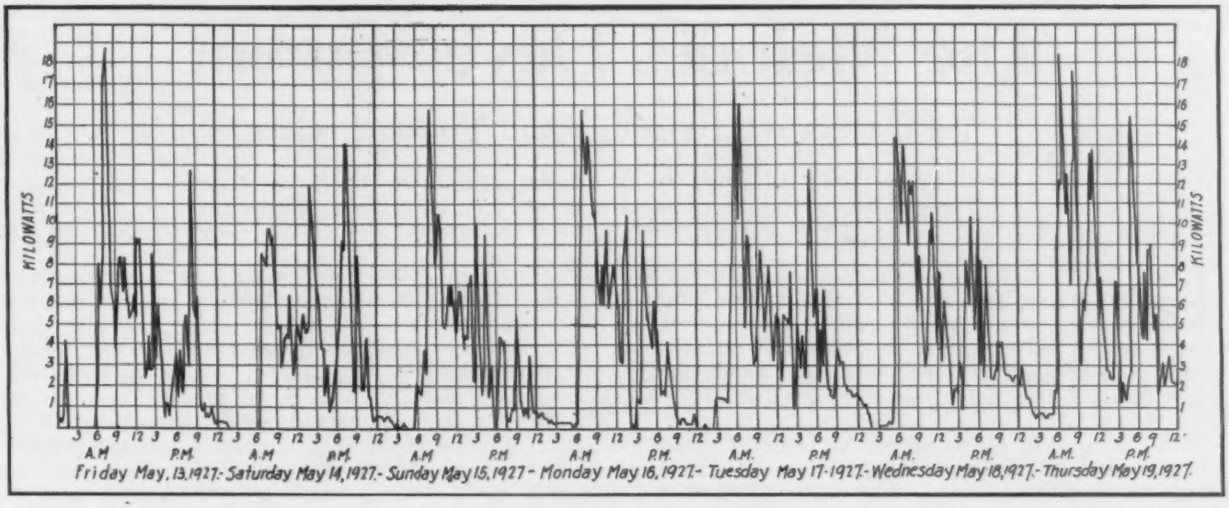
Comparison of water heater consumption with total daily consumption of ten consumers at San Joaquin, Calif. Water heater load is 42 kw., balance of load consists of nine ranges totaling 62 kw. and lights and appliances.

This program was to be subject to modifications or expansions as might seem desirable after the tests were under way.

Following this plan tests were carried on in two localities in California during the spring of 1927, and much valuable information was gained. One of these tests was in the town of San Joaquin on the San Joaquin Light & Power Corporation's system, while the other was made in Elk Grove, a small town on the lines of the Western States Gas & Electric Company. Before reviewing these tests, however, it will be well to point out some of the problems involved in making a water heater survey.

Preliminary investigations brought to light the fact that a water heater survey was radically different from a range survey, and it was found, contrary to the generally prevailing opinion, that the necessary tests would be complicated to a much greater degree than were those made by the range survey committee.

The principle reason for the additional difficulties met lies in the radically different nature of the device itself. In investigating electrical range performance, we find that the physical characteristics of the range, its method of installation, and the manner in which it is operated apparently have very little effect. The curves resulting from the operation of any certain number of


KILOWATTS
Friday May. 13,1927.- Saturday May 14,1927.- Sunday May 15,1927 - Monday May 16,1927.- Tuesday May 17-1927.- Wednesday May 18,1927.- Thursday May 19,1927.

Demand curve for total residential load of ten consumers at San Joaquin, Calif., with a water heater load of 42 kw., range load of 62 kw. and lights and appliances. Daily peaks occur between 6 and 9 a.m. and are but 2 kw. more than the water heater peak. Exclusive of lights and appliances this shows a diversity of better than 5.

ranges will be about the same, regardless of the physical and operating characteristics of the range itself.

Exactly the opposite condition is found with electric water heaters. Almost every characteristic of the water heater has a definite effect upon its operating curves with the result that with the same character of water-heater service to the consumer we may have several different combinations of water-heater apparatus giving entirely dissimilar operating curves.

For example, we find the following variable conditions in water-heater installation in operation:

Insulation—Insulated, non-insulated.

Operation—Automatic, continuous service, manual, intermittant service.

Connection—with double throw switch, with load limiting device, directly on the line.

Size—1 kw. to 6 kw.

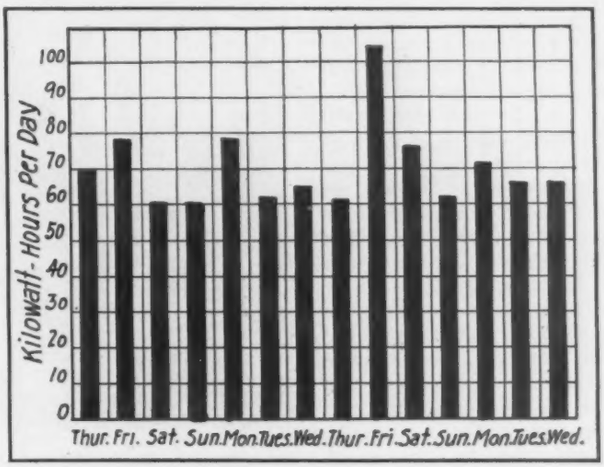
We have here four conditions of which there are sixty different combinations of the twelve variables listed, and practically each one of these may be found operating on some company's lines. These conditions are therefore practical ones which must be investigated, rather than theoretical installations.

In addition we have the difference of opinion as to the desirable temperature of water. It is necessary also to investigate the seasonal effect on the water-heating load. There is also a desire for more knowledge of the operating characteristics of the different types of heaters, including the clamp-on, external circulation, and immersion types and the self-contained insulated types which are being put out by several companies. However, preliminary investigation indicated that the particular type of heater would not have a very marked effect on the operating curves, in comparison with the very noticeable effects resulting from the different installation and operating conditions noted above.

The problem is further complicated by two general questions which must be answered if the test is to be considered a success. First, there are thousands of water heaters at present installed in this country operating under almost every conceivable condition. The companies now serving these water heaters desire information as to the load characteristics and general desirability of the load derived from these heaters. Second, many companies not now aggressive in selling water heating, as well as practically all of the companies which are serving water heater business, want some definite information as to the desirable type of water-heating load to recommend on their lines.

These two general questions call for an entirely different type of investigation. To answer the first question, a group test must be made of existing installations wherever they may be found. To answer the second question, a group test will be required in which each consumer of the group will have practically the same type of apparatus operating under the same conditions. This is virtually a laboratory test, an out-door laboratory test, so to speak, under actual working conditions. This will be difficult to obtain but it apparently is the only accurate way of answering this question.

The tests made during the past year are too incomplete and too limited in scope to warrant any general conclusion being drawn. Some interesting information, however, did result from them and the curves and charts accompanying this article show these results in graphic form. They are a slight indication of what can be obtained when the survey is entirely complete. Those who have had intimate contact with the work so far feel that the tests will be of inestimable value to central stations interested in this type of load, and that a number of prevailing opinions will be strongly disputed by the final results.



Daily water heater consumption of ten customers at San Joaquin, Calif., with an aggregate water heating load of 42 kw. Nine water heaters are manually controlled and one is automatic.

The Melones Development

A Co-operative Irrigation and Power Project

By E. A. Crellin

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THE RECENTLY completed Melones power house of the Pacific Gas and Electric Company affords a striking example of the benefits of co-operation between power and irrigation interests with regard to the use of water. This project was constructed jointly by the Pacific Gas and Electric Company and the Oakdale and South San Joaquin irrigation districts.

Such a joining of forces makes for the best possible economic use of natural resources to the mutual benefit of all concerned. It gives to the irrigation district the full financial benefit of its electrical by-product without diverting any capital from its primary object, and has the further advantage of not diverting the attention of the irrigation directors from their primary problem of successfully raising crops on irrigated land.

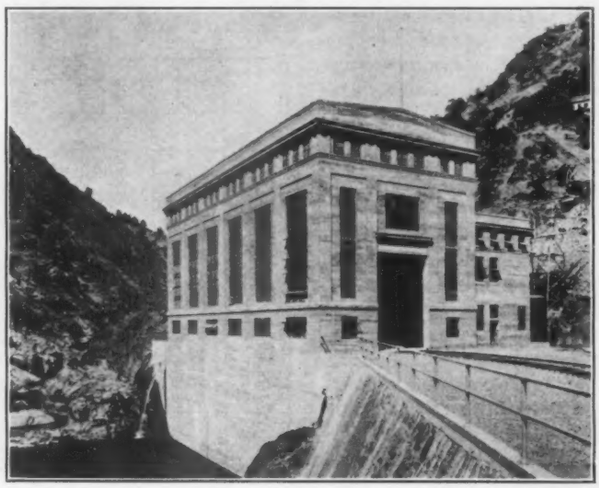
LOW-HEAD, foothill hydroelectric developments are not financially attractive today in competition with the lower construction and operating costs of steam-electric stations. However, foothill storage and control of water for irrigation and related purposes are of increasingly vital importance to the agricultural and commercial development of many large and fertile areas. With the irrigation project comes the question of how best to handle the important by-product, electric power.

Under the terms of a contract dated Jan. 2, 1925, the irrigation districts were obligated to construct the Melones dam and to acquire and turn over to the power company such rights and permits as might be necessary for the construction of the power house. The power company reserved the right to construct other power plants above the Melones plant, the water remaining the property of the irrigation districts, and was obligated to build the Melones power house. Between March 1 and Oct. 31 of each year the irrigation districts control the release of water, the release for the remainder of the year being under the control of the power company except for about 36,000 acre-ft. which must be permitted to pass between Dec. 1 and March 1 of each year for the filling of the Woodward reservoir of the South San Joaquin Irrigation District. The power company will make semi-annual payments to the irrigation districts over a period of forty years, making a total payment of $5,175,000 for the period. At the end of the period the irrigation districts will have acquired a dam and regulated water supply at practically no cost to the water users, for the revenue from power will very nearly pay not only the interest but the redemption charges on the bonds. On the other hand the power company will have acquired water-power rights in a development which will generate approximately a hundred million kw-hr. annually.

The drainage area supplying water for the project comprises approximately 900 sq. miles of terrritory lying principally in Calaveras, Tuolumne and Alpine Counties and at elevations ranging from 11,575 to 540 ft.

Records since 1903 show that the maximum flood, 1907, was 57,200 sec-ft., equivalent to about 63.5 sec-ft. per sq. mile. With the automatic spillway gates lowered the spillway can pass 17 ft. of water or 119,000 sec-ft., about 132 sec-ft. per sq. mile. Streamflow measurements conducted at Knights Ferry, a short distance below the power site, where the drainage area is 983 sq. miles, show the mean seasonal runoff to be 1,376,000 acre-ft., or about 1,400 acre-ft. per sq. mile. This varies anywhere from 64 to 3,642 acre-ft. per sq. mile. It is estimated that 65 per cent of the total runoff occurs during the irrigation season, from April to September, inclusive.

The dam has been constructed across the upper end of Iron Canyon on the Stanislaus River about ten miles from the town of Sonora in a country made famous by Bret Harte and Mark Twain. It is of the constant-radius arch type, 191 ft. high from stream bed to the top of the radial gates when they are raised. The crest length is 591 ft. and the crest elevation 735 ft., U.S.G.S. datum. The irrigation outlet is located 450 ft. downstream from the dam where the tunnel is tapped by four 60-in. needle valves whose function is to bypass water back to the river when not needed for power purposes.



Melones plant, Pacific Gas and Electric Company, in the foothills of the Sierra Nevada near the once famous community of Sonora, Calif.

The Pacific Gas and Electric Company took up the construction just below the irrigation outlet, at which point a butterfly valve 11 ft. 6 in. in diameter was installed in the pressure tunnel. The tunnel is of concrete-lined horse-shoe section 12 ft. in height and 12 ft. maximum width. It is carried on a slope of 4 ft. per 1,000 ft. for a distance of 4,145 ft., at which point it drops 83.12 ft. in elevation on a 1¼-to-1 incline, thence continuing on a level grade approximately 300 ft.

to a concrete manifold from which two 8 ft. 6 in. penstocks lead to the turbines.

The choice of generating equipment was governed by the hydraulic conditions and the relation of the plant to the system to which it is connected. The water flow schedule required by the irrigation districts together with the variable head encountered as the storage water is withdrawn from the reservoir predetermined the annual plant output and fixed the generating capacity at about 27,000 kva.

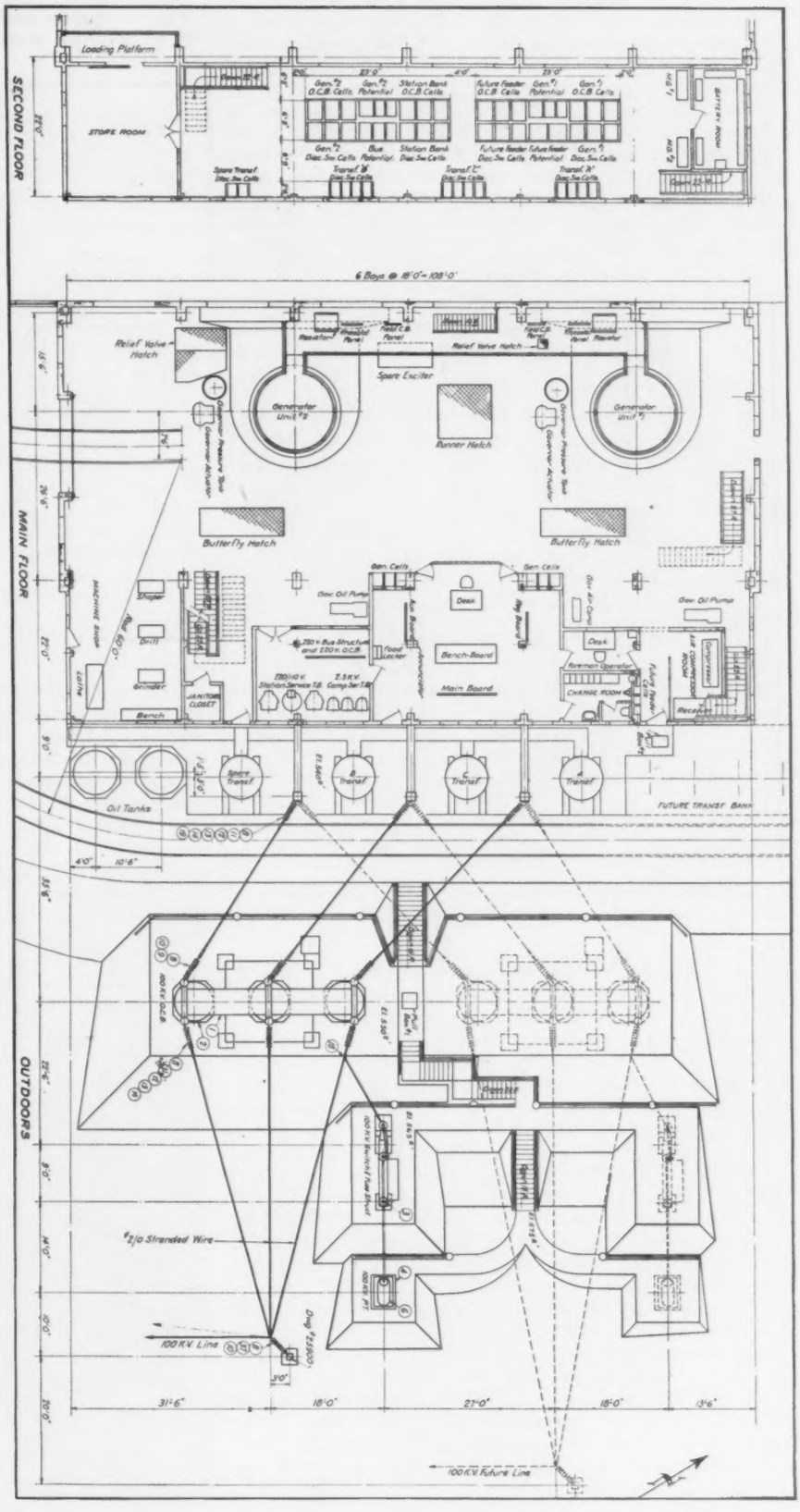
Two generators are installed, each rated at 13,500 kva., 6.6 kv., 277 r.p.m., 0.90 power factor, and direct connected to vertical Francis type turbines rated at 17,900 hp. The kw. output of the plant will vary over a wide range depending upon water conditions. However, due to the fact that it is necessary to pass the water through the plant for irrigation uses even at reduced head, both units will be in operation a large percentage of the time.

The annual load factor of the plant will be low, and for this reason no spare generating capacity has been installed as insurance against shutdowns and repairs or to carry peak loads. This lack of standby capacity is further justified by the fact that the plant, with its 27,000 kva. of installed capacity represents only 6.3 per cent of the installed hydroelectric generating capacity of the system to which it is connected, and this is still further backed up with a large steam reserve.

At the lower end of each penstock and the entrance to the turbine scroll case there is a butterfly valve 8 ft. 6 in. in diameter which may be closed to permit inspections or repairs to a unit without the necessity of unwatering the tunnel and shutting down the entire plant. These butterfly valves are motor operated and controlled by three push-button stations, one near the valve operating mechanism, one on the turbine floor, and an emergency station in the switchboard room convenient to the operator for closing only.

Each turbine is equipped with a relief valve of sufficient capacity to discharge 100 per cent of the maximum quantity of water taken by the turbine at full gate. There is no surge chamber in the water conduit and the relief valves of 100-per-

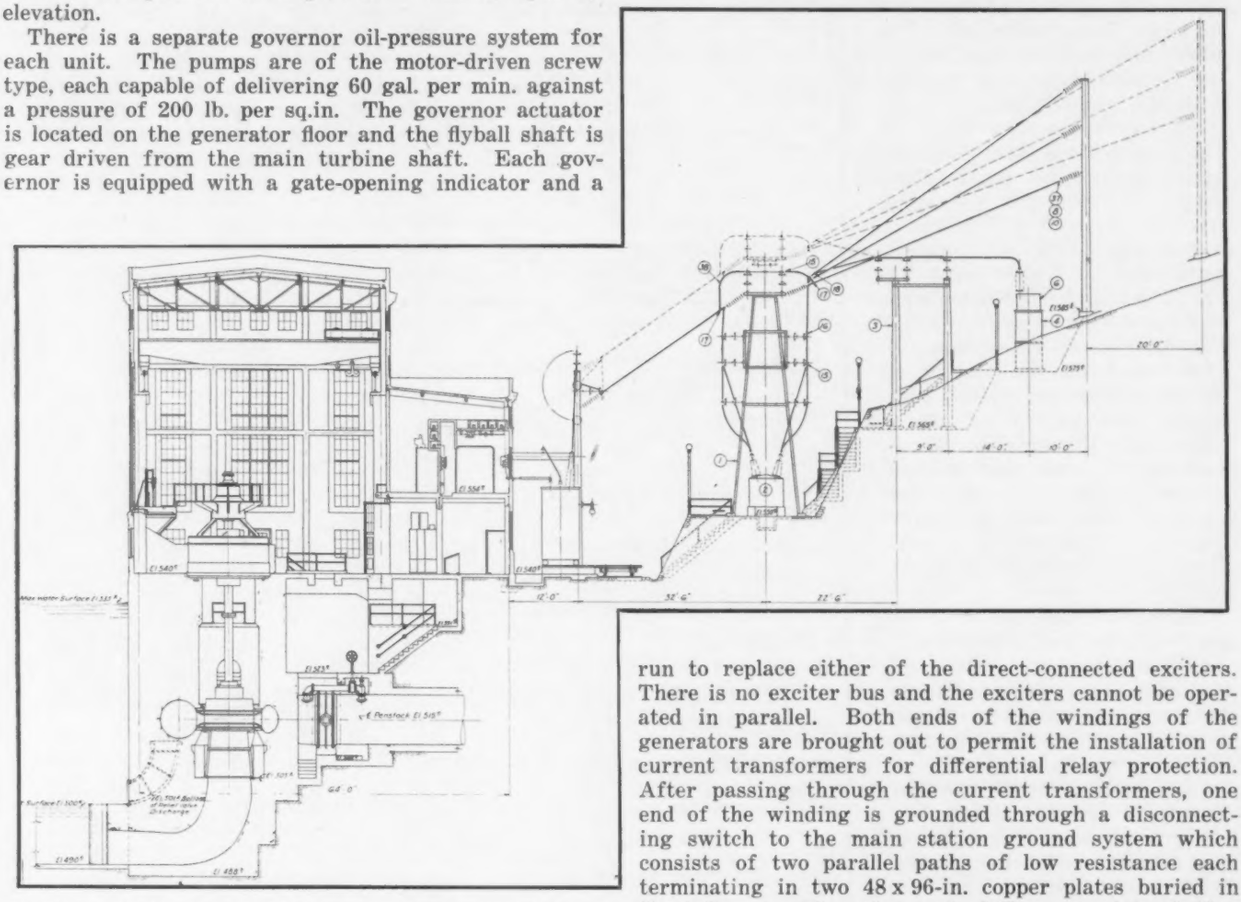
Equipment Layout



Plot plans of the power house and switchyard showing the arrangement of equipment. Usable ground was limited, necessitating careful planning.

cent capacity are necessary to prevent excessive pressure rises upon sudden load rejection. A surge chamber is not desirable for a plant having a wide variation in head because it will set up large fluctuations in head on the unit when operating during the low water period, as it is not practicable to provide a variable spillway elevation.

There is a separate governor oil-pressure system for each unit. The pumps are of the motor-driven screw type, each capable of delivering 60 gal. per min. against a pressure of 200 lb. per sq.in. The governor actuator is located on the generator floor and the flyball shaft is gear driven from the main turbine shaft. Each governor is equipped with a gate-opening indicator and a load-limiting device to which are attached electrical position indicators for the operation of indicators on the main switchboard to show the operator at all times the conditions of operation. There also is an electrical tachometer with its indicator mounted on the main switchboard. This is especially useful in bringing the unit up to speed and enables the operator to judge conditions at speeds below the range of the standard frequency indicators, or when running without field on the generators. There also is a solenoid-controlled emergency shutdown device mounted on the governor which enables the operator to stop the unit quickly in case it becomes necessary to do so. The operator at the main switchboard has full control of the turbine and can start or stop the unit or vary the load at will.



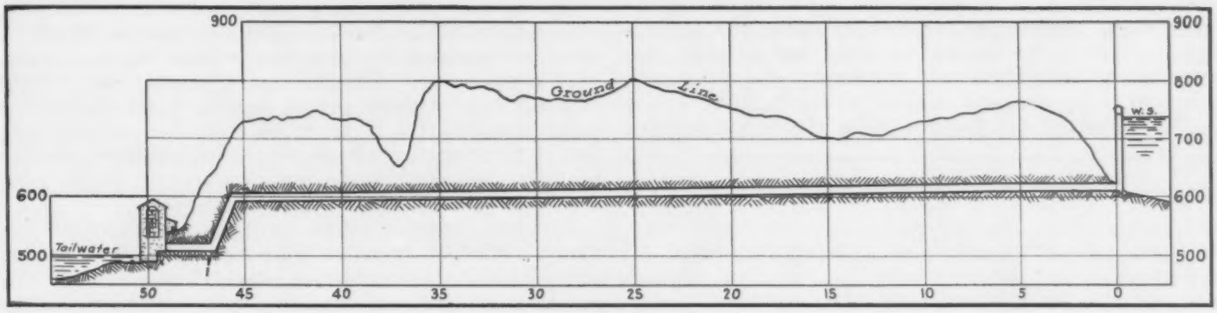
Sectional elevation through Melones power house and switchyard.

The possibility of high tail water during the flood season made it necessary to put the generator floor well above the turbine floor and for that reason all parts requiring frequent attention are on the main generator floor convenient to the switchboard room. This makes it unnecessary for the operator to visit the lower floors except for periodic routine inspection and oiling.

Reference to the wiring diagram will show that the electrical arrangement is the simplest possible, there being only three 6.6-kv. oil circuit breakers in the plant, two 1,200-amp. Type O-11 breakers between the generators and the bus, and a 600-amp. Type O-11 breaker for control of the station power transformer bank.

Each generator has a 100-kw., 250-volt direct-connected shunt-wound exciter and there is a spare 100-kw., 1,200-r.p.m., 250-volt motor-driven exciter set which may be run to replace either of the direct-connected exciters. There is no exciter bus and the exciters cannot be operated in parallel. Both ends of the windings of the generators are brought out to permit the installation of current transformers for differential relay protection. After passing through the current transformers, one end of the winding is grounded through a disconnecting switch to the main station ground system which consists of two parallel paths of low resistance each terminating in two 48 x 96-in. copper plates buried in the tail race. The other end of the generator winding is connected through varnished-cambric-insulated cables carried in fibre duct to the generator oil circuit breaker on the second floor of the power house and thence to the main 6.6-kv. station bus.

High-tension transformer bus and take-off structure.



Profile of the Melones development.

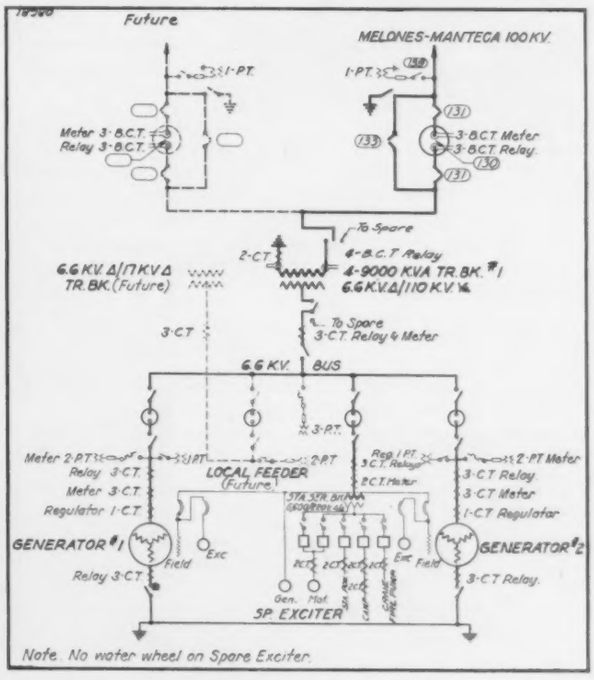
The bus structure is of concrete and space is provided for the two generator oil circuit breakers, the station service oil circuit breaker and a future outgoing low-voltage feeder to meet any requirements for local load demands that may develop in the vicinity of the power house. There is a single 6.6-kv. bus of ¼ x 4-in. copper bars carried on 15-kv. post-type insulators. In addition to the main bus bar there is a set of bars for making up the delta of the low side of the main transformer bank and a pair of bars arranged with suitable single-pole double-throw disconnecting switches for substituting the spare transformer for any one of the three units comprising the main transformer bank.

From the main bus bars current is fed through three 3,200-amp. disconnecting switches into the main transformer-bank delta connections and thence through wall bushings direct to the low-voltage terminals of the transformers. The low-voltage connections are direct and quite short and result in a minimum of exposed 6.6-kv. conductor, improving the safety and reliability of operation.

There is a single bank of three 9,000-kva., oil-insulated, water-cooled transformers which step up the voltage to 110 kv. for feeding into the 110-kv. transmission network of the system. A fourth unit is held in reserve as a spare and, as previously indicated, is so arranged that it may be switched in to replace any unit requiring inspection or repairs. It was found that, in addition to affording a more simplified arrangement, the single bank of large transformers had a higher efficiency at half load than smaller transformers would have had at full load, thus further justifying the installation of a single large bank rather than a bank for each generator.

There is no 110-kv. bus structure, the only approcah to one being in the connection arrangement for the switching of the spare transformer unit to replace a unit in the bank. From the transformers the line passes through a Type R-72, 110-kv. oil circuit breaker to the transmission line which is carried on a double-circuit steel tower line 42.7 miles to Manteca substation where it ties in to the 110-kv. network of the Pacific

Generator room showing main generator field switches and rheostats located on a gallery between the two units.

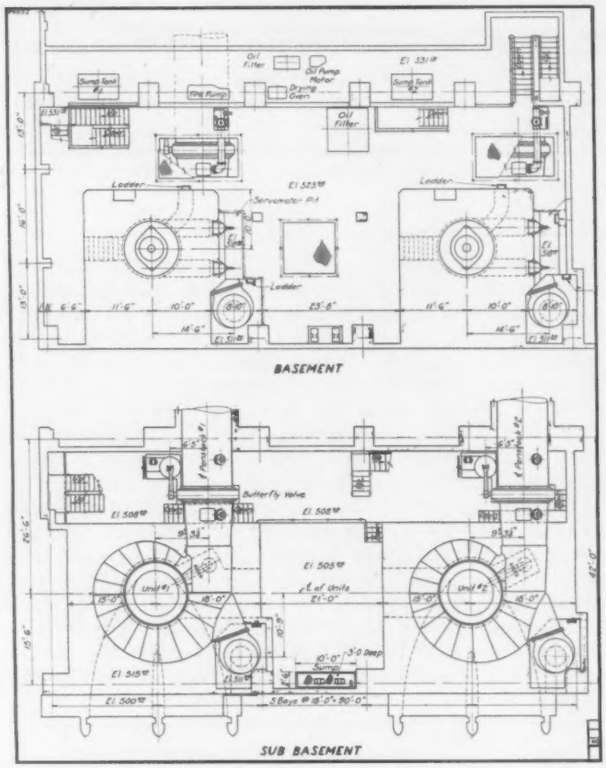


Single-line wiring diagram showing simple connection scheme.

Gas and Electric Company system. Provision is made for a second 110-kv. oil circuit breaker and transmission circuit should it later become desirable to tie into the system at another point, or to add standby line protection.

The main switchboard consists of a vertical instru-

ment and relay board in five panels and a control benchboard of the same length. At the left end of the vertical board is a swinging bracket on which are mounted the synchroscope and associated voltmeters and frequency indicators. At the right end of the vertical board is a smaller swinging bracket mounting the bus voltmeter



Plan views of basement and sub-basement showing equipment locations.

and frequency indicator. In addition to the usual electrical instruments, each generator panel has mounted on it a gate opening indicator, a load-limit position indicator and a speed indicator. These instruments are of the same general appearance as the electrical instruments and afford the operator an opportunity of ascertaining at a glance the complete story of the operation of the unit.

At the left of the main switchboard and at right-angles to it is placed a 3-panel board on two panels of which are mounted the generator voltage regulators and exciter rheostats. The third panel carries the controls of the storage battery and its motor-generator charging equipment. At the right of the main switchboard and also at right-angles to it is the station auxiliary switchboard, a steel-panel dead-front switchboard for the control of the station lighting and power circuits.

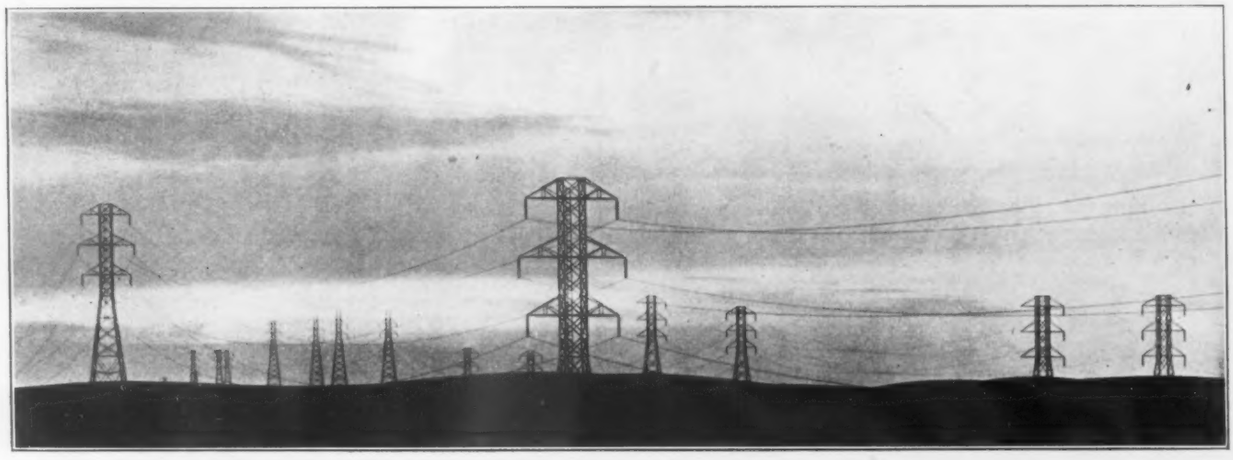
The main generator field switches and rheostats are remote controlled from the main control benchboard and are mounted on a gallery on the tail-race side of the power house and between the two generators. This permits a minimum length of field and exciter leads and permits a close grouping of associated equipment for convenient installation and operation.

Melones power house becomes an important unit in the group of 32 hydroelectric plants of the Pacific Gas and Electric Company. It will rank fifth in point of annual output, exceeded only by Pit River No. 1 and No. 3, Stanislaus and Drum power houses. The equipment installed in the plant has proved highly efficient, the turbines especially passing their acceptance tests with remarkably high efficiencies. Under test the turbines gave efficiencies above 90 per cent with a load range from 9,500 to 11,300 hp. under 160-ft. head, from 10,500 to 14,800 hp. under 185-ft. head, from 11,500 to 17,000 hp. under 205-ft. head and from 12,300 to 18,600 hp. under 220-ft. head. A maximum efficiency of 94 per cent was attained which is an exceptional performance for a unit designed for operation under such a wide range of head. Full-load generator efficiency attained was 97.53 per cent and the transformer efficiency 99.11 per cent.

Efficiencies such as these reflect the high state of perfection now possible in the design and manufacture of equipment for hydroelectric plants. Only a very small percentage of the energy available in the falling water is lost in its transition to electrical energy for delivery to the transmission lines, and the best possible use of natural resources is approached in highly efficient apparatus.

Melones dam and power house will stand as monuments to the spirit of co-operation between the irrigation and power interests of California which, in the words of the Secretary of Commerce, Herbert Hoover, "is the only practical way in which so many of our California water problems can be solved.

A Forest of Transmission Towers Near San Francisco Bay



Engineering Practice

An Experiment with the Wheeler Patent Fish Lift on the Umpqua River, Oregon

By J. E. YATES, Assistant Chief Engineer, Pacific Power & Light Company, Portland, Ore.

AN important development looking toward a solution of the "fish vs. dam" problem was found in the experiment carried on in the summer of 1926 at the Winchester dam of The California Oregon Power Company on the Umpqua River near Roseburg, Ore.

To date fish ladders have utilized the pool principle, in which the fish ascend by jumping from one pool to an adjoining pool at a slightly higher elevation. The Wheeler device departs radically from this principle. It consists of a hollow, vertical tube, cylindrical or rectangular in shape and equipped with one gate near the bottom and another near the top. This hollow tube is installed as a part of the dam in such manner that the lower gate is at about the same elevation as the water below the dam and the upper gate is about level with the water above the dam. The operation begins with the lower gate open and the upper closed.

Water admitted from above the dam flows out through the lower gate, attracting the fish into the interior of the tube. After a predetermined time interval the lower gate closes and the tube fills with water admitted from the bottom. When the tube is about two-thirds full the upper gate opens and the filling operation is completed through the upper gate. The interior of the tube is equipped with a close-fitting screen supported by floats two or three feet below the surface of the water. This screen rises with the rise of the water in the tube and keeps the fish swimming near the top of the water column. After entering the device through the lower gate the fish are confined by a trap. When the tube has filled, a suitable opening in the screen allows the fish to pass through the upper gate to the waters above the dam. After a predetermined time interval the upper gate closes and the device empties through a valve at the bottom. The process then is repeated. Operation of the lift is entirely automatic; movement of the gates is controlled by a small motor driving suitable cams.

The installation at Winchester, which was a trial installation only, was not completed in time for the entire spring run. However, many salmon from the last of this run were put over with the device. Following the run of Chinook salmon was a summer run of steelhead trout. On a trial of the Wheeler lift on Aug. 8-9, 79 out of an available 100 of these steelhead were taken over. Sixteen separate lifts were made, one of which put over 27 fish and a second 20. These two lifts were made in the early morning hours when the steelhead are active, while during the middle of the day, when the steelhead are less active, a lesser number were put over. This test was handicapped by a shortage of water and could be made only with the Winchester plant shut down.

Other conditions having a bearing upon the experiment should be noted. The steelhead trout is a more active and more timid fish than the salmon and does not spawn until January or February. Hence in August there was no great impelling motive driving the run upstream as is the case when the spawning run is on. Since the problem is one of trapping the fish rather than of raising them, the conditions surrounding the August experiment were less favorable than they would have been could the experiment have been conducted during a spawning run.

Fig. 1. Close-up of fish elevator.

This particular device is patented by J. R. Wheeler of Reedsport, Ore. It has a number of features worthy of mention. Its operation requires little water. Also, it is next to impossible for salmon to be injured in their passage through it whereas they are frequently bruised in jumping from pool to pool in the ordinary fish ladder. A third advantage is that it is possible to screen off and destroy smaller predatory fish. This particular installation was made for low-head conditions, but the device can be adapted readily to high lifts.

This experimental installation was financed by a number of utilities in the Northwest in co-operation with the Fish Commission of Oregon. Its success, like that of experiments elsewhere, is found in the fact that salmon can be led from their customary paths and induced to enter devices for their assistance over obstructions, and not in the fact that they were successfully forced over. The successful operation of mechanical apparatus for raising the fish was never an issue, but it is gratifying to note that the device operated according to expectations.

Experimental installation of Wheeler fish lift installed at Winchester dam. The lift may be seen in the middle distance.

Special Roller Cradles Designed for Penstock Line

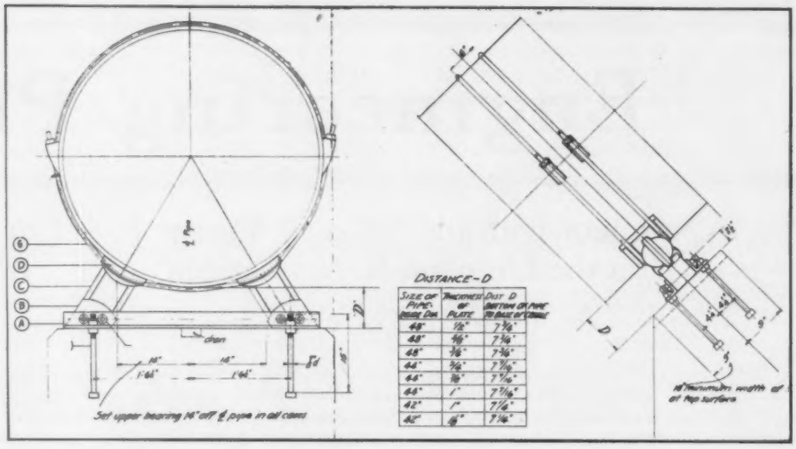
Roller cradles were used on the pressure pipe line of the Mystic Lake development of the Montana Power Company. The hour-glass shape of this roller is of appreciable aid in securing alignment of the roller without the need of extremely accurate work. To hold the rollers in their proper places a pair of diametrically-opposite gear teeth is provided at each end of the roller. These teeth mesh with slots in the upper and lower bearing plates. Thus the roller is locked in position as far as transverse motion is concerned but is free to rotate in the longitudinal plane of the pipe sufficiently to permit the pipe to assume its normal position without strain or friction.

At the left in the accompanying illustration is shown a transverse section of the pipe line at one of the bearing piers showing in detail the method of mounting and installation. At the right in the illustration is a side elevation at one of the piers giving further mounting details, showing how the roller teeth mesh with the bearing plates and indicating also the double band method of fastening the upper bearing plates to the pipe itself.

Rollers and both bearings are made of gray cast iron carefully cast true to pattern and subsequently cleaned and pickled and ground smooth.

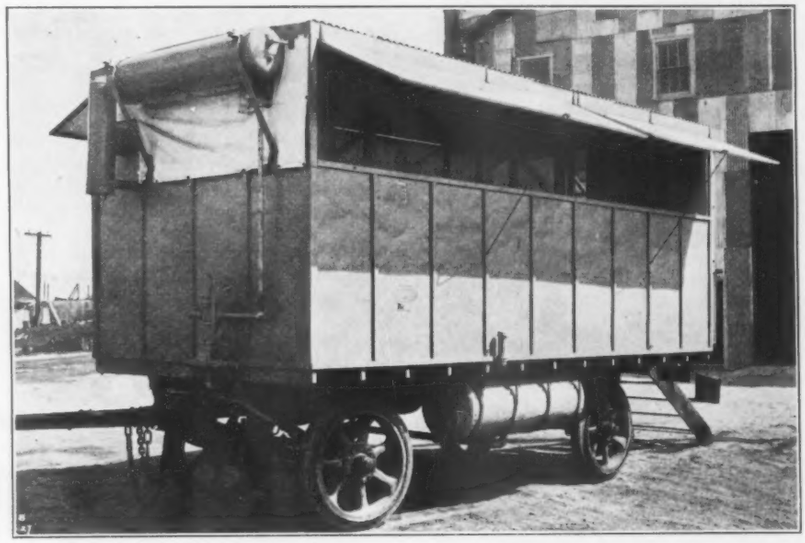
Original plans were to support the pipe line by three pairs of flat-faced shoes at each bearing pier, one shoe of each pair a brass shoe to reduce contact friction. However, even with this arrangement difficulty was anticipated in the even distribution of bearing over the entire face of the shoes. Further, it was quite possible that during cold weather the entire bearing would become solidly frozen and thus require a great force to move it, resulting in pipe strain.

In this particular pipe line the anchor piers are located anywhere from 150 to 340 ft. apart with expansion joints approximately midway between each pair of anchor piers. With this arrangement the frictional drag of the rollers and of the expansion joints is approximately balanced on each side of the anchor piers and the total movement at any one roller bearing is reduced to the minimum possible. The intermediate supporting piers are placed at about 20-ft. centers. The installation has worked out very nicely and successfully has withstood snowslides and other winter conditions.



Application of hour-glass rollers to pipe-line support.

Portable Kitchen for Construction Camps

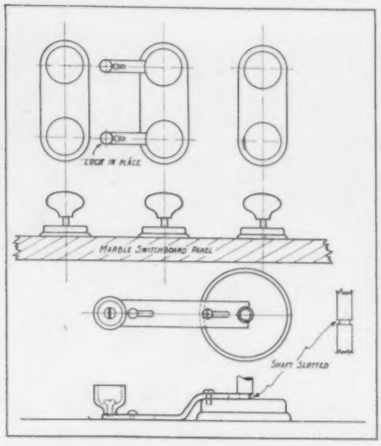


To avoid the necessity of setting up an expensive camp kitchen for short-lived camps along the 224-mile Vincent 220-kv. transmission line the Southern California Edison Company developed the trailer kitchen pictured above and built three of them. These movable cookhouses are equipped with an oil-burning range, dishwashing facilities, flowing water from tanks mounted on the trailer and storage cabinet space for such food staples as flour, sugar, condiments, spices, etc. While these cook wagons were constructed to care for not more than 50 men at times they have actually cared for 75.

A Safety Lock for Bench-Board Pull-Button Controls

Details of an effective safety device to prevent inadvertent operation of important controls are shown in the accompanying illustration.

As originally developed this locking device was applied to the field-control pull-button which was located immediately adjacent to the governor and rheostat-control buttons for a steam-electric generating unit. Operation and control of the generating unit required frequent manipulation of the governor and rheostat pull-buttons and the close proximity of the field-control button constituted an operating hazard. The operator naturally watches his meters during manipulation of these buttons and only a slight slip on the operator's part might cause the operation of the wrong control. The scheme was devised by H. R. Loftus of the San Diego Consolidated Gas & Electric Company.



Diagrammatic sketch of simple safety lock for important controls.

Ideas for the Contractor

To Make "Holding the Sack" a Lost Art

Jobber and Contractor-Dealer Alike Suffer When No Mutual Cost Accounting System Is Used to Maintain a Sound Relationship Between Them

THE tenderfoot on a hunting trip seldom escapes his first "snipe hunt." Shivering in the cold, with foolish lantern in one hand and open sack in the other, he waits for the "snipe," which isn't there, to come, attracted by the light, he has been told, and walk into the open sack. But to this day no record exists of anyone ever capturing a "snipe" in this weird, traditional fashion. Of young hopefuls to "hold the sack" on each new expedition, however, there seems to be no end.

Unfortunately, in the electrical business, likewise, there have been many sack-holding parties and here, too, the crop of young hopefuls seems to have no end. But whereas the "snipe hunt" of a campaign trip seldom results in any more serious consequence than that of being the joke of the camp, with perhaps a bad cold thrown in for good measure, sack-holding in the electrical industry often results in commercial suicide.

The electrical brand of sack-holding results usually from the failures in business of hopeful contractor-dealers. Until recently when an electrical contractor failed in business it was just too bad but no one thought that anything could be done about it. The jobber who had "financed" him, through the loan of materials—sold on time but no less a loan until paid for—was left, sack in hand, unable to collect.

One such occurrence every so often could be charged off to one of the famous "profit and loss" twins of the accounting ledger. But several such experiences, or even the failure of one heavy borrower of materials, say, very often left the supplier sacked indeed. Credit hopefully extended without the reasonable demand that the materials loaned would be used in such a way as to earn a reasonable profit for the contractor as well as pay for the materials themselves, has sunk not only many well-intentioned contractors who kept no record of what it cost them to do work, but the jobber who "sold" them the materials to be paid for when the job was finished.

Whether to their liking or not, therefore, it has come to be realized by far-seeing jobbers and experienced contractors that they are bed fellows one of the other. What weakens the business of one, it is being recognized, weakens that of the other. Therefore, if anything is to be done about it the task demands the efforts and the financing of both. If either sidesteps his responsibility in this mutual task and thrusts the burden entirely upon the other the unbalanced load will cause either the throwing off of the burden or the weakening of the one carrying it to such an extent as to reflect itself sooner or later upon the other.

HIGH mortality among electrical contractors is everybody's business. The public and the industry pay dearly for every failure, every cheap or skimped job. In some localities contractors and jobbers, determined to save themselves from economic suicide, are assuming a saner relationship based upon a knowledge of the cost of doing business. Milwaukee is such a locality. Some of the salient features of the so-called "Milwaukee Plan" of jobber-to-contractor relationship are detailed in this article.

Oregon Electragists Hear Plan

When the electrical contractors of Oregon met in Portland last month to form a state association of Electragists a representative of the jobbers in Oregon presented to the newly formed organization what has been called the "Milwaukee Plan." For some months the jobbers and the leaders among contractors in Oregon had discussed the merits of the plan and the advisability of placing it in operation in Oregon. It has been declared likely that this newly created assocation of Electragists will begin its activities upon some constructive movement similar to that proposed by the jobbers at the organization meeting. Whether they use the Milwaukee plan or some local equivalent matters less than that they devise some workable solution and apply it. What is the plan by which the relationship between contractor-dealer and jobber may be placed upon more solid footing? It is merely a plan whereby the electrical contractor may be put in possession of a genuine cost accounting system and the jobber assists him in getting it and in maintaining it. The details of the plan are best derived from the explanation sent out to all members of the Electrical Contractor-Dealers Association of Milwaukee at the inception of the paln.

The first page of a four-page mimeograph form is a letter addressed to the contractor:

Mr. Contractor:

Are you enjoying a satisfactory profit from your business? If you are now making a profit would you like to increase that profit? Can you tell your exact cost of material and labor on all of the jobs you do? If you are guessing at your cost, the chances are you may guess wrong, perhaps not on every job but on enough of them so that at the end of the year the profit which should be yours has unknowingly been passed on to your customers.

If you do not keep accurate records of your cost you must necessarily guess more or less. Now is the time to stop these leaks and the opportunity is offered to stop them at the expense of your suppliers.

The undersigned, appreciating the importance of cost accounting, will furnish electrical contractors and contractor-dealers of Milwaukee County with a complete set of Standard Accounting System books and forms and assume the expense of installation thereof under the conditions set forth in the attached.

There follows a list of the jobbers co-operating in the plan. The details of the plan itself follow:

PLAN OF DISTRIBUTION
STANDARD COST ACCOUNTING SYSTEM

Following is a synopsis of the plan under which the jobbers and manufacturers subscribed hereto agree to furnish the electrical contractors and electrical contractor-dealers in the territory described in the following paragraph with complete set of Standard Accounting System books and forms and the installation thereof, under the conditions as follows:

1. To Whom the Offer Applies. All Electrical contractors and electrical contractor-dealers whose principal places of business are located in Milwaukee County, who have not heretofore adopted the Standard Accounting System or some other system of records which show their actual cost of material, labor, job expenses, etc.

2. To Whom to Apply. To any of the jobbers and manufacturers whose names appear heron, W. F. Baumann, secretary, Electrical Contractor-Dealers Association or Wm. Schuelke, accountant of the so-called "Milwaukee Plan."

3. The Time Limit for Application. Dec. 1, 1924 to Feb. 28, 1925.

4. The Plan. Commencing Dec. 1, 1924 and running to and including Feb. 28, 1925, applications will be received for the installation of the Standard Accounting System, the cost of which is $100; $50 representing the cost of the system and $50 expense of installation, including one month of service of the accountant. Applicant will pay this cost at the time of installation to the trustees of this fund. If applicant is unable to make cash payment in the above amount at the time of application, he has the privilege of a divided payment plan as follows: $10 cash to accompany the application and three payments of $30 each, 30, 60 and 90 days apart, which payments will be secured by notes bearing interest at the rate of seven per cent per annum, dated as above.

The amount so paid to be refunded under the following conditions: The jobbers and manufacturers subscribing hereto will refund the cost of the system and the expense of installation on the basis of 1 per cent of the volume of business placed and paid for with each such member during the period of one year from date of completion of the installation, each member refunding on the basis of the volume of business placed with him.

Example: Total volume of business necessary to secure refund of entire cost of installation—$10,000; monthly average of $833.33. Assuming the contractor has done with each of the six contributors during the year a volume of $1,666.66, each such subscriber will refund the contractor through the trustees $16.67, fully reimbursing the contractor for the expense of installation. Or, if the volume was confined to two subscribing members on the basis of $5,000 with one and $5,000 with the other, refund of $50 and $50 respectively would be made. Or, if the entire volume was done with one house, that house would assume the entire cost of $100. In the event that a contractor's volume does not amount to sufficient to secure refund of the total cost, refund will be made on a pro rata basis—if volume amounted to $6,000, refund of $60 will be made. A volume of $4,500 will entitle the contractor to a refund of $45, the balance of the cost to be assumed by the contractor. In no case will refund be made exceeding the expense of installation—$100.

When the volume placed and paid for exceeds $10,000 the contributing members will pro rate the expense on the basis of the volume which each has done during the year.

Example: Volume of business done $20,000, divided equally among the six houses, each house will refund ½ of 1 per cent of their respective volumes.

The accountant, Mr. Schuelke, will furnish the committee at the end of the year or at the expiration of any other period, if deemed advisable, a certified statement showing the amount of refund due acount of each installation and the amount due from each of the interested jobbers or manufacturers.

No refunds will be made under this plan except as follows: The contractor accepts the condition hereof and agrees to maintain the system for a period of at least one year; at the end of six months, provided the above conditions have been complied with, 50 per cent of the refund earned at that time will be given to such contractor; the balance will be refunded at the end of the year.

5. Cost of Keeping Records. In the event that some contractors desire the continued services of the auditor of the Electrical Contractor-Dealers' Association, nominal charges for his services will be made according to the following schedule:

Monthly business to $ 1,500, $ 3.50 per week.
Monthly business to $ 2,500, $ 5.00 per week.
Monthly business to $ 5,000, $ 7.50 per week.
Monthly business to $ 7,500, $10.00 per week.
Monthly business to $10,000, $12.50 per week.

The above charges include everything in the way of keeping an accurate record of all transactions week-to-week and month-to-month; in other words you would be having the services of a regular bookkeeper for a great deal less than you could hire one by the month.

Should any contractor desire merely to engage the auditor to close his books monthly and take a trial balance and make financial statement each month, such services will be charged for at the rate of $10 per month.

The above gives you all the desired information as to how to obtain the Standard Cost Accounting System.

Below you will find a form of application which you can fill out and send to either one of the parties named in this bulletin. Your application will receive prompt attention.

There follows an application blank to be used by the dealer in asking for this service.

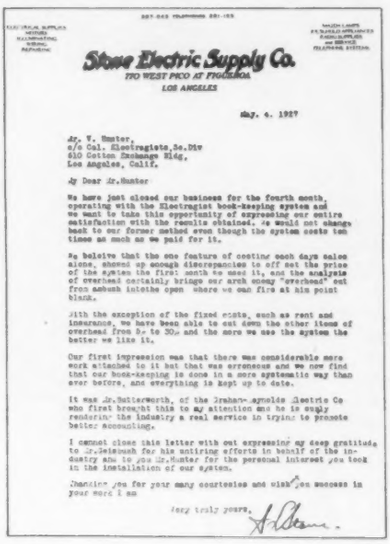
In an address to the convention of the Association of Electragists, International, at West Baden in 1925, F. W. Greusel, president of the G-Q Electric Company, a jobber of Milwaukee, described the events which had led up to the evolution of the plan and of its successful operation in that territory. While it is impossible to reproduce his entire talk here, as would be very desirable because every word of it is important, a number of his statements will serve to emphasize the value of the set-up in that city.

Statistics prove the mortality rate of the contractor to be extremely high. Approximately 6,000 contractors were in business Jan. 1, 1923, of which nearly 1,200 went out during the year. Of 7,000 dealers, about the same number made their exit, and of 8,000 contractor-dealers, about 1,250 folded their tents. Taking the three classes together, 17.4 per cent passed out during the year, and at the same ratio, in a little less than six years we have one complete turnover. A survey of the entire membership of the National Association of Electragists, using Dun or Bradstreet's mercantile agencies for the purpose, reflected the following condition in reference to commercial rating:

18½ per cent were not listed.
15 per cent were listed but not rated.
13 per cent limited credit.
34 per cent fair credit.
12 per cent good credit.
7 1-3 per cent high credit.

The above figures indicate that 80 per cent are doubtful, limited or bad. Turnover of capital invested and merchandise are things to be desired, but turnover in customers is quite another problem, and the situation in our organization for years received the same consideration that it did by others, which was in consoling ourselves each time a failure occurred by the fact that this or that particular competitor of ours was a heavier creditor than we, or in the event we did top the list of unfortunate creditors, that we had secured a good share of patronage previously, which justified our loose extension of credit.

During a reorganization of our company, which took place early in 1920, our treasurer entered our ranks in his present capacity, after twenty-odd years administrative experience with one of the largest railroad companies in the country, and with no jobbing experience whatever. Within a very short time after his advent we received one of our periodical jolts from a referee in bankruptcy, advising that so-and-so, one of our good accounts, was through and we, as well as some twenty-odd other suppliers, might in the course of time, realize 15 or 20 cents on the dollar.



Stone Electric Supply Co.
TRO WEST PICO AT FIGUEROA
LOS ANGELES

May. 4. 1927

Mr. T. Hunter,
c/o Cal. Electragists,So.Div
610 Cotton Exchange Bldg,
Los Angeles, Calif.

My Dear Mr.Hunter

We have just closed our business for the fourth month, operating with the Electragist book-keeping system and we want to take this opportunity of expressing our entire satisfaction with the results obtained. We would not change back to our former method even though the system costs ten times as much as we paid for it.

We beleive that the one feature of costing each days sales alone, showed up enough discrepancies to off set the price of the system the first month we used it, and the analysis of overhead certainly brings our arch enemy "overhead" out from ambush intothe open where we can fire at him point blank.

With the exception of the fixed costs, such as rent and insurance, we have been able to cut down the other items of overhead from 8- to 30% and the more we use the system the better we like it.

Our first impression was that there was considerable more work attached to it but that was erroneous and we now find that our book-keeping is done in a more systematic way than ever before, and everything is kept up to date.

It was Mr.Butterworth, of the Graham-Apgeles Electric Co who first brought this to my attention and he is truly rendering the industry a real service in trying to promote better accounting.

I cannot close this letter with out expressing my deep gratitude to Mr.Jelinek for his untiring efforts in behalf of the industry and to you Mr.Hunter for the personal interest you took in the installation of our system.

Thanking you for your many courtesies and wishing you success in your work I am

Very truly yours,

Typical letter from a contractor testifying to the proved value of a cost accounting system. A jobber recommended its installation.

This bit of news, in spite of the fact that we had lots of high class company, did not make a very favorable impression on our new treasurer, who stated that credit losses were a new experience to him, as in the railroad business there was no account created to charge off poor credit extensions. In an effort to appease him and justify our loss I presented voluminous statistics showing that for a period of years the credit losses of various jobbers ranged from ½ per cent to 1 per cent of their annual volume and that we were confortably within the minimum range and that it was the commonly accepted practice to take our loss and start over again with someone else who might or might not be able to prove his case.

A few more losses came and it was decided to correct the problem. Mr. Greusel continued:

We found the dealer as a rule proved to be the most desirable credit risk, for the reason that he was more of a merchant than the others. He recognizes and practices the principles of merchandising and accounting, and is usually an excellent account. The contractor and contractor-dealer, however, is confronted with a different problem, inasmuch as he is working more or less in the dark on the important subject of his cost, and is liable to loss from too low estimates on contract jobs. Some contractors operate on the basis of learning, if possible, whether or not a competitor is estimating on the work, and if so, what price has been offered and what equipment specified. The next step is to get under the competitor's price. Fewer outlets, cheaper fittings, less conveniences are suggested. Trimming, lopping, shearing, pruning and clipping are resorted to. In the end the customer gets the cheapest job he will accept, and as a rule, the contractor takes a loss, although he has no method of determining how much.

Mr. Greusel went on to describe the establishment of the plan whereby accounting systems were furnished to contractors by jobbers. Then he described the results of the plan in these telling words:

Shortly after the first of the year it was found that a substantial percentage of contractors had installed the Standard Accounting System, more in actual numbers, I believe, than are installed in any other city in the country. Not a single system has been discontinued, and every user is loud in his praise of benefits obtained and anxious to see his brother contractor operating on a similar plan.

If I were not limited in the time allotted to me, I would be able to recite instances where the benfits derived by contractors seem almost unbelievable; instances where discouraged contractors who had been in business several years without profit were operating on a profitable basis within a period of sixty days after installation; instances where a smaller volume of business taken at the right price resulted in greater net profits than previously were enjoyed.

Speaking for our company, I can state that during 1924, unless some adverse condition develops which at the present time is not apparent, our credit losses in Milwaukee from contractor-dealers will be practically nothing, and we have enjoyed during the present year a greater increase in volume from the contractor-dealer than from any other class of the trade.

Not only in Milwaukee has the installation of a cost accounting system proved invaluable to the electrical contractor. The California Electragists, Southern Division, have made available to their members the Electragist Accounting System which, with a few additions, is the Standard Accounting System already referred to and used in connection with the Milwaukee plan.

Several letters, written by contractors who have installed this system of their own initiative and employ T. V. Hunter, accountant for the Southern Division, bear testimony as to its value to them. The letters reproduced in connection with this article, typical of many, will suffice to show how the contractor-dealer benefits under such a plan.

Why Officials Should Support a Standard Ordinance

Third of a Series of Articles on the Reasons for the California Association of Electrical Inspectors' Recommended Ordinance

By JAMES M. EVANS, Electrical Engineer, Board of Fire Underwriters of the Pacific, Los Angeles

SEVERAL questions arise in the minds of officials whenever the question of an electrical inspection ordinance comes to their attention.

Is there a real necessity therefor?

What standard should be set in the congested areas?

What standard should be set in the residential areas?

What benefits do the voters derive?

What expense will be entailed upon the voters?

What expense will be added to the budget?

How much personnel is required?

A Real Necessity

There is a very definite necessity for electrical inspection. During 1925 there was reported into the Actuarial Bureau of the National Board of Fire Underwriters, a loss of $15,168,864 due to electrical causes. This figure does not cover uninsured property nor fires of questionable origin. It is customary to add to this figure at least 25 per cent to cover small fires for which there was insurance but which were not reported. Yet not all of the burnt property was insured.

Reduced to an hourly basis this means that the equivalent of one residence every hour is destroyed by fire. Where are these fires occurring? Do they occur where the inspection is well done? Just a moment's thought will convince anyone that a very small percentage of this loss occurs in those localities where over 75 per cent of the people live, that is, in cities of 45,000 and over. Is it not to be expected that approximately 25 per cent should be lost in these places to the 75 per cent in others?

With a record of this kind the importance of inspection—state-wide, yes, nation-wide—is readily seen. To attain this it is necessary to start with political incorporations which already have the machinery and the power to set up inspection.

Classes of Construction

But should all be required to live up to the same standard?

Evidently there are four distinct classes of city growth of building construction. The first embodies the individual farm house, and the village with a number of dwellings and a few stores, gradually merging into the residential districts of the largest cities. The second comprises the congested high value districts of towns and cities. The third takes in the special cases of hospitals, sanitariums, theaters, churches, auditoriums and places similar in that they are used by large bodies of people and should therefore have special consideration. The fourth class is composed of industrial plants.

There are, however, but two general electrical construction types recognized by the national electrical bodies. These are "knob and tube" work and "all-metal" work. The application of these two types is very simple. Wherever there is a congested district, or wherever there is grave danger, due either to panic or to a fire which would threaten helpless people or children, a type of wiring is justified that will give the necessary protection. This is the "all-metal" work. In industrial plants the question of the personal hazard is of first importance and this is covered quite satisfactorily (at least in California) by the Electrical Safety Orders of the Industrial Accident Commission and in a national way by the Electrical Safety Orders of the Bureau of Standards.

In all other locations only the barest recognized minimum need be enforced. The recognized minimum is in the National Electrical Code as adopted by the National Fire Protection Association and approved by the Bureau of Standards.

Which Pays Best

Voters who have put their money into homes or commercial establishments seldom have more than a very hazy idea of the requirements of safe wiring. Any high school boy can convince them that he knows "enough to wire the place." But when they have paid the full price of a complete job and get only an "apprentice" job or when they pay some friend a price commensurate to what they actually get in wiring for their money and then later have their house or establishment burn down, they realize that the proper type of inspection is a necessity. The inspection departments of large cities were designed to prevent conflagration hazards, but the benefits to the property owners were so great that it is generally conceded that the value of the inspection department from these benefits alone is much greater than the cost of the fees. And in most cases the fees pay all expenses, so that there is no burden on the budget.

An organization starting an inspection department cannot tell just what the future will demand in the way of personnel, but no inspector should be expected to do more than ten or twelve new jobs a day and also keep up reinspections.

Few municipalities or other incorporations without electrical inspection can altogether appreciate the difficulties of drawing up a satisfactory ordinance. In order to be of assistance in this matter the California Association of Electrical Inspectors at a recent meeting adopted what it termed a uniform electrical ordinance. Because this ordinance is well worth serious consideration before any electrical ordinance is drawn up copies have been made available upon request to the secretary.

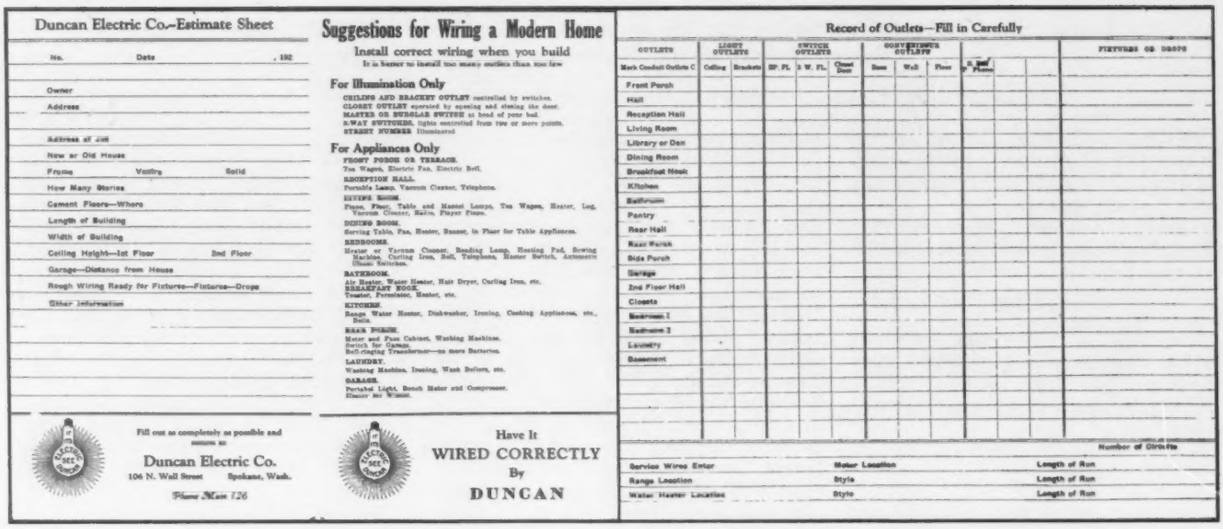
Red Seal Takes to the Boards

WOOD & WEBER CONSTRUCTION CO.
Builders of THE DENVER POST MODEL HOME IN BONNIE BRAE, Have adopted the
Red Seal Plan of Wiring
TO ASSURE
ADEQUATE, CONVENIENT ELECTRIC SERVICE
Is your home Properly Wired?
ELECTRIC HOME
ELECTRICAL LEAGUE of COLORADO. GAS & ELECTRIC BLDG.

In a further effort to co-operate with the home builders of the community, the Electrical League of Colorado, Denver, erected this 10 x 25-ft. illuminated billboard which features the Red Seal Plan of Wiring. The board is located in the heart of one the city's newest subdivisions and faces a main highway. It is equipped with five 200-watt lamps.

The success which the league has had in conducting Electric Home exhibits has encouraged many home builders and real estate men to follow suit. This model home is being sponsored by one of the largest newspapers in Denver, and, although the league is taking no active part in the display, the home will be complete electrically.

Estimate Sheet Used to Sell More Outlets



Duncan Electric Co.—Estimate Sheet

No. Date , 192

Owner

Address

Address of Job

New or Old House

Frame Veneer Solid

How Many Stories

Cement Floors—Where

Length of Building

Width of Building

Ceiling Height—1st Floor 2nd Floor

Garage—Distance from House

Rough Wiring Ready for Fixtures—Fixtures—Drops

Other Information

Fill out as completely as possible and return to

Duncan Electric Co.
106 N. Wall Street Spokane, Wash.

Phone Main 126

Suggestions for Wiring a Modern Home

Install correct wiring when you build
It is better to install too many outlets than too few

For Illumination Only

CEILING AND BRACKET OUTLET controlled by switches.
CLOSET OUTLET operated by opening and closing the door.
MASTER OR BURGLAR SWITCH at head of your bed.
3-WAY SWITCHES, lights controlled from two or more points.
STREET NUMBER Illuminated

For Appliances Only

FRONT PORCH OR TERRACE.
Tea Wagon, Electric Fan, Electric Bell.
RECEPTION HALL.
Portable Lamp, Vacuum Cleaner, Telephone.
LIVING ROOM.
Piano, Floor, Table and Mantel Lamps, Tea Wagon, Heater, Log, Vacuum Cleaner, Radio, Player Piano.
DINING ROOM.
Serving Table, Fan, Heater, Buzzer, in Floor for Table Appliances.
BEDROOMS.
Heater or Vacuum Cleaner, Reading Lamp, Heating Pad, Sewing Machine, Curling Iron, Bell, Telephone, Heater Switch, Automatic Toaster Switches.
BATHROOM.
Air Heater, Water Heater, Hair Dryer, Curling Iron, etc.
BREAKFAST NOOK.
Toaster, Percolator, Heater, etc.
KITCHEN.
Range, Water Heater, Dishwasher, Ironing, Cooking Appliances, etc., Bells.
REAR PORCH.
Meter and Fuse Cabinet, Washing Machines, Switch for Garage, Bell-ringing Transformer—no more Batteries.
LAUNDRY.
Washing Machine, Ironing, Wash Boilers, etc.
GARAGE.
Portable Light, Bench Motor and Compressor, Heater for Winter.

Have It
WIRED CORRECTLY
By
DUNCAN

Record of Outlets—Fill in Carefully

OUTLETS	LIGHT OUTLETS		SWITCH OUTLETS			CONVENIENCE OUTLETS				FIXTURES OR DROPS
Mark Conduit Outlets C	Ceiling	Brackets	3P. Fl.	3 W. Fl.	Closet Door	Base	Wall	Floor	2 Pole Flush	
Front Porch										
Hall										
Reception Hall										
Living Room										
Library or Den										
Dining Room										
Breakfast Nook										
Kitchen										
Bathroom										
Pantry										
Rear Hall										
Rear Porch										
Side Porch										
Garage										
2nd Floor Hall										
Closets										
Bedroom 1										
Bedroom 2										
Laundry										
Basement										

Number of Circuits

Service Wires Enter — Meter Location — Length of Run
Range Location — Style — Length of Run
Water Heater Location — Style — Length of Run

Combination sales folder and estimate sheet.

CLAN DUNCAN would seem to be pre-eminent in the electrical business. In the June Electrical West appeared an account of the methods used by L. A. Duncan of Los Angeles in the matching of material bins with material slip notations. The August issue contained an intensely human and interesting story of how Charles Duncan, manager of the Arvada (Colorado) Electric Company, set a new range-selling record by the clever use of a movie show tie-in.

Now comes word that another Duncan, this time in Spokane, Wash., has brought forth another constructive idea of value to the contractor-dealer.

The latter is a combined suggestion and estimate sheet. It has been prepared to make easy the obtaining of information from builders or from home owners upon which estimates can be computed.

The front page contains a number of suggestions for wiring a modern home. First are presented suggestions for illumination only. Another list of suggestions is made for appliances, or to be more correct the placing of convenience outlets to be used for the appliances mentioned in the list. The suggestions are listed as to location, such as front porch, reception hall, living room, dining room, bed room, bath room, breakfast nook, kitchen, rear porch, laundry and garage.

Inside is a form for a record of the outlets. On the back is the Duncan Electric Company estimate sheet. A copy of this form has been reproduced on this page.

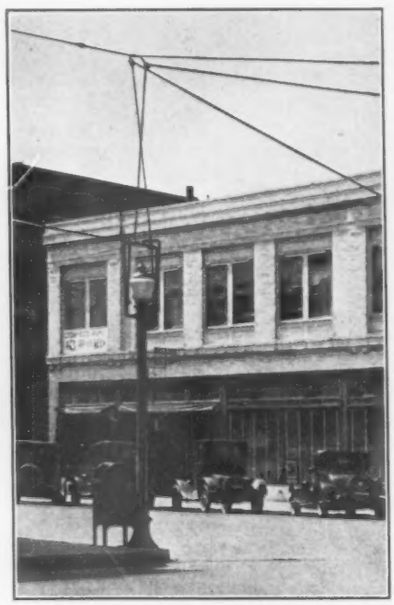
The form when placed in the hands of prospective builders, architects and building contractors suggests to them possibilities for increased convenience which may be achieved by means of a more modern wiring system. In the hands of a good salesman this one form, which, when folded, is of the size which will fit into a notebook or envelope, contains all the information necessary for making a good sales presentation and at the same time taking down the essential information in respect to a job from which an estimate can be prepared.

How Not to Install Street Lighting

A system for wiring ornamental lighting standards which is as ingenious as it is unattractive is to be found in a city in California served by a municipal power system. Where little attention is paid to the public's reaction (because the public must take what is given to it by the city organization, which is law) such an installation is permitted when it would never meet the approval of public officials should a private system seek to install a similar type of job.

Wires are brought from overhead poles to a cage made of angle iron surrounding the lighting unit, from which they are carried exposed to the unit. The framework surrounding the lamp causes shadows, interrupting the light cast from the unit and lowering the efficiency of the lighting system.

To the electrical contractor doing street lighting work this installation presents an example of what should not be done. It may be pointed to as wholly undesirable when methods of installation of wiring for new street lighting systems are under contemplation.



Overhead wires disfigure the installation.

Largest Signs Claimed for Seattle Theater

An electric roof sign, vertical sign and what is said to be the largest attraction board ever produced on the Pacific Coast, the combined job involving $30,000 expenditure, is being completed in Seattle by the Independent Sheet Metal Company, Inc., for the Orpheum Circuit, Inc., the installation to be made on the one million dollar new Orpheum Theater, Fifth and Westlake Avenues and Stewart Street.

The roof sign reading, "Orpheum Vaudeville-Photoplays," will be 60 x 60 ft., letters 8 to 14 ft. high, containing approximately 4,000 25-watt lamps. The vertical sign reading "New Orpheum," will be 70 ft. high, 12 ft. 6 in. wide at top, 5 ft. 6 in. at the stem and 7 ft. 6 in. at the base, containing approximately 2,600 25-watt lamps. The attraction board, 9 x 12 ft., will contain 1,800 lamps and will have a reading capacity of 770 letters.

The entire electrical display will consume approximately 1,000 kilowatts of electrical energy each month. Much sign activity is being reported from Seattle.

Typical residence installations of electric heating, at the left in the fireplace and right, under windows.

Estimating Heat Losses for Air Heating Installations

By J. R. WILSON*, Quality Electric Works, Los Angeles

Electrical Estimating Series XXVIII

AS MENTIONED earlier, certain information regarding the premises to be heated must be obtained before an intelligent recommendation of proper heater sizes can be made. This information has to do with the building construction, exposure, glass area, openings, etc. After such data is obtained the estimator can make the necessary calculations, based upon the temperature desired, with the assurance that the installation will prove efficient and satisfactory.

To grasp readily the methods used in making these calculations several typical problems may be worked out using the tables given herein. The following examples indicate the method of determining the size of heaters for different types of buildings:

Living room 14 x 20 ft. with 9-ft. ceiling, having two outside walls, 20 ft. wall exposed to winds. Glass area 75 sq.ft. Frame construction, plastered inside, boarded and plastered outside. Double wood floor, plastered ceiling, no floor above. Two air changes per hour. Difference between outside and required room temperature 30 deg. F.

Refer to Table 1 under 30 deg. F. temperature difference in order to determine the watt-hr. per sq.ft. for each particular surface.

The following gives method of making calculations:

(1)	Glass area	× watt-hr. lost per sq.ft.
(2)	Outside wall (less glass area)	× watt-hr. lost per sq.ft.
(3)	Inside wall area	× watt-hr. lost per sq.ft.
(4)	Floor area	× watt-hr. lost per sq.ft.
(5)	Ceiling area	× watt-hr. lost per sq.ft.
(6)	Vol. of room × air changes per hour	× watts required per cu.ft.
(7)		Allowance for exposed area.
(8)		Total watts required.

EXAMPLE 1.
Residence.

	Surface	Area sq.ft.		Watt-hr. Lost per sq.ft.	Total Watt-hr. Lost
(1)	Glass		=	75 × 9.0000	675
(2)	Outside wall	(14 + 20) × 9 — 75	=	231 × 3.9000	901
(3)	Inside wall	(14 + 20) × 9	=	306 × 1.2000	367
(4)	Floor	(14 × 20)	=	280 × 0.7500	210
(5)	Ceiling	(14 × 20)	=	280 × 3.0000	840
(6)	Air	(14 × 20 × 9 × 2)	=	5040 × 0.0162	813
(7)	Exposed area	(20 × 9 × .25)	=	45 × 3.9000	176
(8)	Total watts required				3,982

It will be noted that the watts required in this room are 1.58 per cu.ft.

In making the calculations for residence heating, each room should be figured separately. However, for quick estimating it is usually safe to figure 0.55 watts capacity for each 10 deg. F. difference in temperature between room and outside air. This rule is only roughly approximate and does not hold true, however, under abnormal conditions or where the volume is less than 1,000 cu.ft. or greater than 5,000 cu.ft. As the volume increases the watts required per cu.ft. will become less. This is due to the radiating surface not being increased in direct proportion to the volume.

In the case of office or other buildings having a large number of rooms, unless it is a definitely known fact that all rooms are to be heated and used at all times, each room should be treated separately, and losses computed for the inside walls as well as the floors and ceilings. This will always result in the installation of much larger capacity heaters than would be installed if a steam plant were used, but it is desirable for the reason that the electric heat is used differently from steam.

Where an electric heating system is installed it is not customary to heat rooms not occupied and since electric heaters are almost always controlled by three-heat switches the heat can be regulated easily. It is usually more economical to install heaters of ample capacity so that individual rooms can be heated quickly on high heat and then turn the heaters down to medium or low as may be required to maintain the desired temperature. The electric heater does not possess the same characteristic as the steam radiator, but will continue the heat transfer at the same rate regardless of the increasing room temperature for the reason that the heating coils will rise in temperature and thus maintain approximately the same temperature difference.

When it is necessary to compare electric heater sizes with those of steam or hot water radiators for the same building, and while it is a known fact that radiators vary according to construction, surface of heater and pressure, the following table will give a fair average for comparison:

1 sq.ft. of steam radiator at 4 lb. pressure —70 watts.

1 sq.ft. of steam radiator at 10 lb. pressure—80 watts.

1 sq.ft. of hot water radiator at 180 deg. F.—45 watts.

The selection of the particular type or style of the heater for an installation will depend greatly upon the desire of the customer. Heaters are made in many types including portable types for moving to any desirable location, bracket types for mounting on walls, floor types for mounting beneath the floor (with register set flush with floor line), and flush types for mounting inside of walls.

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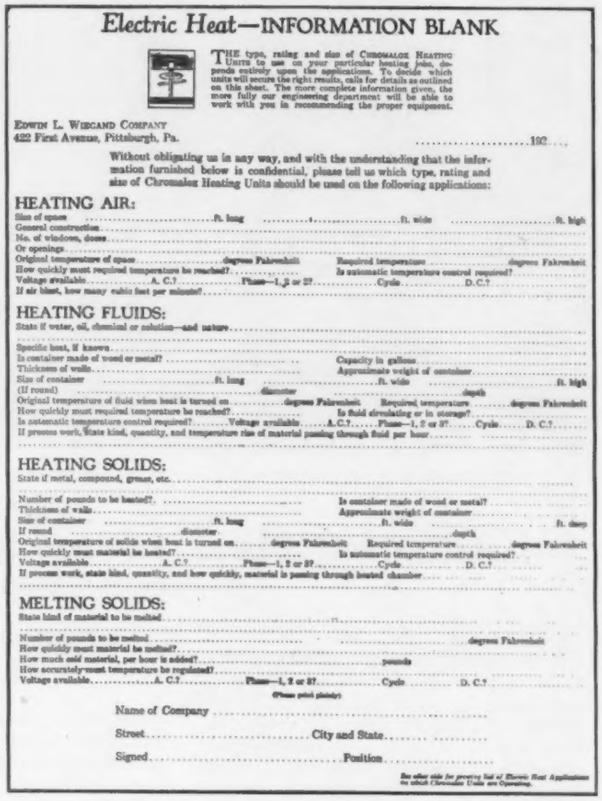
TABLE I—Watt-hr. loss per sq. ft. of surface for various temperature differences expressed in degrees F.

Nature of Surface	10 Deg.	20 Deg.	30 Deg.	40 Deg.	50 Deg.	60 Deg.	70 Deg.
Single glass	3.0	6.0	9.0	12.0	15.0	18.0	21.0
Double glass	1.7	3.4	5.1	6.8	8.5	10.2	11.9
Single skylight	3.5	7.0	10.5	14.0	17.5	21.0	24.5
Double skylight	1.8	3.6	5.4	7.2	9.0	10.8	12.6
8-in. brick wall	1.3	2.6	3.9	5.2	6.5	7.8	9.1
8-in. brick furred and plastered wall	0.7	1.4	2.0	2.7	3.4	4.4	4.7
12-in. brick furred and plastered wall	0.6	1.2	1.8	2.4	2.9	3.5	4.1
24-in. brick wall	0.6	1.2	1.8	2.4	3.0	3.6	4.2
8-in. concrete wall	1.6	3.2	4.8	6.4	8.0	9.6	11.2
8-in. concrete furred and plastered wall	0.8	1.6	2.5	3.3	4.1	4.9	5.8
12-in. concrete furred and plastered wall	0.7	1.5	2.2	2.9	3.7	4.4	5.1
24-in. concrete wall	0.7	1.4	2.1	2.8	3.5	4.2	4.9
4-in. hollow tile, plaster both sides	1.5	3.0	4.5	6.0	7.5	9.0	10.5
8-in. hollow tile, plaster both sides	1.2	2.4	3.6	4.8	6.0	7.2	8.4
4-in. tile, stucco and plaster wall	1.0	2.0	3.0	4.0	5.0	6.0	7.0
8-in. tile stucco and plaster wall	0.8	1.6	2.4	3.2	4.0	4.8	5.6
Corrugated iron	3.3	6.6	9.9	13.2	16.6	19.9	23.2
Wire lath and plaster	1.9	3.8	5.6	7.5	9.4	11.3	13.1
Frame wall with clapboard only	1.3	2.6	3.9	5.2	6.5	7.7	9.0
Frame wall with sheathing and paper	0.8	1.6	2.5	3.3	4.1	4.9	5.8
Frame wall with sheathing and asbestos	0.7	1.4	2.0	2.7	3.4	4.1	4.7
Frame wall, plaster outside	1.3	2.6	3.9	5.2	6.5	7.8	9.1
Frame wall, double board outside	1.0	2.0	3.0	4.0	5.0	6.0	7.0
Partition, lath and plaster both sides	1.2	2.4	3.6	4.8	6.0	7.2	8.4
Partition, lath and plaster one side	2.0	4.0	6.0	8.0	10.0	12.0	14.0
Partition, 1-in. wood	1.8	3.6	5.4	7.2	9.0	10.8	12.6
Partition, 2-in. wood	1.2	2.4	3.6	4.8	6.0	7.2	8.4
Wooden floor, double board	0.3	0.5	0.8	1.0	1.3	1.5	1.8
Concrete floor	0.9	1.8	2.7	3.6	4.5	5.4	6.3
Wooden floor on concrete	0.4	0.8	1.2	1.6	2.0	2.4	2.8
Dirt floor	0.6	1.2	1.8	2.4	3.0	3.6	4.2
Plaster ceiling, no floor above	1.0	2.0	3.0	4.0	5.0	6.0	7.0
Plaster ceiling, floor above	0.8	1.5	2.3	3.0	3.8	4.5	5.3
Wooden ceiling, composition roof	0.9	1.8	2.7	3.6	4.5	5.4	6.3

Watts per cu. ft. of air required to heat air = .0054 per degree of temperature difference.

Note—The accuracy of these tables can not be guaranteed for the reason that no two authorities seem to agree exactly. However, these figures have been used for some time with very satisfactory results, and they are certainly sufficiently correct for ordinary practical purposes.



Electric Heat—INFORMATION BLANK

THE type, rating and size of CHROMALOX HEATING UNITS to use on your particular heating jobs, depends entirely upon the applications. To decide which units will secure the right results, calls for details as outlined on this sheet. The more complete information given, the more fully our engineering department will be able to work with you in recommending the proper equipment.

EDWIN L. WIEGAND COMPANY
422 First Avenue, Pittsburgh, Pa. .....192...

Without obligating us in any way, and with the understanding that the information furnished below is confidential, please tell us which type, rating and size of Chromalox Heating Units should be used on the following applications:

HEATING AIR:

Size of space .....ft. long .....ft. wide .....ft. high
General construction
No. of windows, doors
Or openings
Original temperature of space .....degrees Fahrenheit Required temperature .....degrees Fahrenheit
How quickly must required temperature be reached? Is automatic temperature control required?
Voltage available .....A. C.? .....Phase—1, 2 or 3? .....Cycle .....D. C.?
If air blast, how many cubic feet per minute?

HEATING FLUIDS:

State if water, oil, chemical or solution—and nature

Specific heat, if known
Is container made of wood or metal? Capacity in gallons
Thickness of walls Approximate weight of container
Size of container .....ft. long .....ft. wide .....ft. high
(If round) .....diameter .....depth
Original temperature of fluid when heat is turned on .....degrees Fahrenheit Required temperature .....degrees Fahrenheit
How quickly must required temperature be reached? Is fluid circulating or in storage?
Is automatic temperature control required? .....Voltage available .....A.C.? .....Phase—1, 2 or 3? .....Cycle .....D. C.?
If process work, state kind, quantity, and temperature rise of material passing through fluid per hour

HEATING SOLIDS:

State if metal, compound, grease, etc.

Number of pounds to be heated? Is container made of wood or metal?
Thickness of walls Approximate weight of container
Size of container .....ft. long .....ft. wide .....ft. deep
If round .....diameter .....depth
Original temperature of solids when heat is turned on .....degrees Fahrenheit Required temperature .....degrees Fahrenheit
How quickly must material be heated? Is automatic temperature control required?
Voltage available .....A. C.? .....Phase—1, 2 or 3? .....Cycle .....D. C.?
If process work, state kind, quantity, and how quickly, material is passing through heated chamber

MELTING SOLIDS:

State kind of material to be melted

Number of pounds to be melted .....degrees Fahrenheit
How quickly must material be melted?
How much *cold* material, per hour is added? .....pounds
How accurately must temperature be regulated?
Voltage available .....A. C.? .....Phase—1, 2 or 3? .....Cycle .....D. C.?

(Please print plainly)

Name of Company
Street .....City and State
Signed .....Position

See other side for growing list of Electric Heat Applications for which Chromalox Units are Operating.

Above, table from Electric Air Heating Committee report, P.C.E.A. At right an ingenious information blank designed to assist the contractor to get information relative to specific or unusual cases.

There is only a slight variation in the efficiencies of these heaters so the choice of selection must be governed by the conditions of each installation. In the majority of installations the best engineering practice dictates the installation of flush or permanent types of wall or floor heaters. Being installed as a permanent part of the building fixtures, the property value is increased.

Ample Capacity Most Important

In the majority of installations the estimator should endeavor to provide ample capacity in heaters to provide a "quick heat," that is, capacity to bring the room temperature to the desired point in the minimum of time. Then, by means of three-heat switches or automatic regulation, a part of the heating elements may be cut out of circuit and the desired temperature maintained.

One of the greatest selling points used with electrical heating prospects is the fact that the heat "can be felt" almost instantly. And one of the things that very quickly breeds dissatisfaction with ANY system of heating is to "stand around shivering" while the heating equipment is getting ready to "do its stuff." So don't lose sight of the psychological effect of satisfaction through "quick heat."

One of the paramount factors in determining the ultimate results in any heating installation is the degree to which insulation of the building has been carried out. Thorough insulation of buildings is one of the best investments that can be made and is of primary importance wherever heating equipment is to be installed. This rule applies whether electrical or fuel heating equipment is to be employed. Authentic data of savings in cost of fuel as high as 40 per cent, due to a slight investment in building insulation, are a matter of record. The U. S. Bureau of Industrial Research has issued a statement that the fuel saved in three years will pay for the cost of insulation. Where heating equipment of low convection is employed, building insulation will serve to provide even heat distribution.

Electric air heating will prove successful in any type of room or building, if careful consideration is given to the use or occupancy of the room or building. Haphazard selection or placing of electric heaters will only lead to dissatisfaction on the part of the customer. It may be of interest to mention a few of the typical locations in which electric air heaters are now being regularly installed.

Apartment Houses

Builders of apartment houses are beginning to realize the inherent advantages of electric heater installations. With complete electric heater installations each tenant has control over the heat to meet his particular needs. The heat is available at any hour of the day or night. The services of a janitor are dispensed with and no investment in a large central heating plant is required. The usual practice is to purchase the current at wholesale through a master meter, and re-sell it to each tenant through sub-meters.

This method results in a low rate to the tenants, and has a tendency to increase customer satisfaction. Some apartment house owners even sell the current to the tenants at a lower rate than that which they (the owners) pay. They feel they are justified in so doing because of the savings made in elimination of attendant and repair charges.

Hotels

Numerous hotels have been equipped with electric heaters and the installations are giving entire satisfaction. This satisfaction is the result of the jobs having been properly engineered and the proper size and number of heaters having been installed. The usual practice in these installations is to install a central distribution panel in the hotel office. The wiring to each heater is run to this panel, and the clerk can turn on the heat as soon as a room has been let. The heater can also be turned off when the occupant returns the key to the desk.

Churches

Churches require heat only a few hours per month, but this heat must be quickly available for use. The heating installation must be of sufficient capacity to bring quickly any desired part of the building to a comfortable temperature, and capable of regulation to maintain the desired temperature. The low cost and extreme flexibility of electric heating makes this type of installation particularly adapted to the heating of churches. Another favorable point is that this type of load is usually "off peak," and should command a very favorable rate from the power companies.

(To be continued.)

News of the Industry

A.I.E.E. Holds Sixteenth Coast Convention

Lightning Protection of Oil Storage, High-Tension Phenomena, Communication, and Power Line Stability Feature the Discussion

THREE major divisions of thought occupied the attention of the 254 persons attending the sixteenth annual Pacific Coast convention of the American Institute of Electrical Engineers at Del Monte, Sept. 13-16. These were toll-line telephone communication, lightning and other high-tension research, and high-tension power transmission and immediately related problems. Attendance at the various sessions was heavy and the interest keen. A truly national scope was given to the convention activities by the attendance and participation of delegates from Schenectady, Pittsburgh, New York and other Eastern cities. The John B. Fisken golf trophy was won by C. E. Heath, Southern California Edison Company.

The 1928 convention will be held in Spokane, Wash., the early part of September, 1928, under the auspices of the Spokane Section.

Student Convention

One of the innovations which worked out with particular satisfaction was the student convention to which was devoted the major portion of the first day.

The papers prepared at the California Institute of Technology at Pasadena included A Method of Measuring Extremely High Resistances, Electrical Wiring at the California Institute of Technology, Production of High Vacuua, Some Recent Experiments with the Vacuum Switch, and Some Factors Affecting Flashover Voltage of Insulators. From Stanford University: Harmonic Phase Orientation, High-Voltage Oscillator, High-Voltage Phenomena in the Atmosphere, Super-Regeneration, and Tuned Power Lines. From the State College of Washington: The Evolution of the Thermionic Vacuum Tube. From the University of Southern California: Tests of a 9,375-kw. Water-Wheel Generator by the Retardation Method; Tests of a New Type of Constant-Current Regulator. From the University of Utah: Power Factor Characteristics of the Fynn-Weichsel Motor. From the University of Washington: A Table of Mathematical Values and an Alignment Diagram of the Steinmetz Equation, The World's Largest Automatic Hydroelectric Station, and The 500-Mile Transmission Line with Distributed Synchronous Condensers. From the University of California: Design of an Electro-Magnetic Absorption Dynamometer.

Transmission Problems

A study of the transients due to short circuits on the 220-kv. system of the Southern California Edison Company prepared by R. J. C. Wood and L. F. Hunt of that company and S. B. Griscom of the Westinghouse company brought forth the conclusion of the authors that perfect continuity of service on an extensive transmission system is economically unfeasible, but that protective equipment should be designed and operated to permit only momentary disturbance. The tests brought out that one of the main factors in reducing disturbances and preventing loss of synchronism between the generating and receiving ends of a transmission system between the severity of the disturbance is the rapidity with which relays and switches can be made to operate to isolate any trouble that may occur. One of the most important points brought out by these tests was the relationship and the amount of ground current upon short circuits, demonstrating the value of adopting means to limit short-circuit current. Apparently, the higher the voltage of the system the more pronounced is this effect. The authors found that practically all short circuits have been single phase to ground. A factor that would seem to suggest the advisability of a relatively high ground resistance is the fact that when a single-phase flashover occurs, there is a material increase in total system load due to the power consumed in the fault. This additional load suddenly applied to the system causes a transient redistribution of power between the various synchronous machines and results in power oscillations or surges.

An extremely thorough mathematical treatment and analysis of the electric oscillations in a double-circuit, 3-phase transmission line was presented in a paper by Yoshio Satoh, graduate student, Stanford University. In the absence of the writer this paper was read by F. E. Terman. The author, in discussing electric oscillations, shows that there are three kinds of traveling waves:

(1) the wave between conductors of each of the 3-phase transmission circuits; (2) the wave between the entire group of six conductors as one side and the ground as the other side; (3) the wave between the group of 3 conductors of one circuit as one side and the group of 3 conductors of the other circuit as the other side.

The author's treatment of his subject offers a useful method of calculation of these various waves.

In discussing equipment for 220-kv. systems, J. P. Jollyman, Pacific Gas and Electric Company, stated that four years' operating experience has shown that 220-kv. transmission is fully as reliable as lower transmission voltages, and much more economical. To lessen the effect of short circuits and grounds and to reduce the amount of energy which must be dissipated within a high-voltage oil circuit breaker, the author recommends developments that will permit a complete breaker operation to open the circuit in well under ½ sec. In speaking of the satisfactory operation of the 220-kv. transmission line of his company, the author recommends the use of ample safety factors in tower design, low stringing tension for conductors, a generous length in insulator strings to provide adequate flash-over distance, and the use of some device for suppressing corona discharge of the conductor and wire clamp at the insulators.

Discussing these two papers, M. Michener, Southern California Edison Company, brought out the fact that high resistance grounds are better for relaying transmission troubles on a 220-kva. line, but that precaution is necessary to avoid dangerously high potential gradients adjacent to tower footings where these higher resistance grounds are used. Performance data presented by F. R. George, Pacific Gas and Electric Company, on the Pit River 220-kv. lines of the Pacific Gas and Electric Company showed that the flashover frequency has been four flashovers per year per 100 miles of circuit. No stability troubles have been experienced to any etxent on these lines because the comparatively light total loading of 120,000 kw. for both circuits is well below the stability limit. According to E. R. Stauffacher, Southern California Edison Company, the four main factors upon which depends the stability of a transmission line are: high-speed relay operation, high-speed circuit breaker operation, certain features of generator design particularly as to short circuit ratio, and the application of quick-response excitation to generators.

As a further contribution toward the ultimate betterment of transmission line equipment, Roy Wilkins and E. A. Crellin of the Pacific Gas and Electric Company presented a paper outlining exhaustive service tests upon high-voltage oil circuit breakers. The authors contend that oil circuit breakers are in use today simply because there is at present no better substitute for the service now performed by them. The authors recommend certain fundamental requirements as essential in an oil circuit breaker for use in high-voltage transmission network:

(1) the total operating time for a complete open-close-open cycle of operation at rated current and voltage shall not be more than 0.2 sec.; (2) the arcing time shall approach as closely as possible the ideal of ½ cycle; (3) the energy for the switch operator shall be stored and available for instantaneous release. The mechanism should not have a power demand in excess of 1 kw. In discussing this particular point the fact was brought out that a power demand up to 5 kw. would not be considered excessive for heavy breakers but that an operating demand above that requires too much investment in copper for operating controls; (4) the breaker shall be capable of completing 100 normal operating cycles before requiring any inspection or adjustment. Here the authors suggest that if requirements 1 and 2 are met successfully there should be no trouble in producing a breaker that would operate even 1,000 times before requiring adjustment; (5) the breaker shall be so designed that it can be installed, adjusted and maintained by the average mechanic without special training in circuit-breaker technique.

Stability and Synchronous Condensers

Another phase of the transmission problem involves the addition of synchronous condensers to the transmission system to promote system stability. Design and operating characteristics of synchronous condensers were described in a paper presented by P. L. Alger, General Electric Company, Schenectady. According to the author the continually increasing importance of this class of equipment makes it desirable to simplify and standardize the design specifications as much as possible by eliminating special and fundamentally unnecessary restrictions in the purchaser's specifications. Also, the use of synchronous condensers is more satisfactory and more economical than the use of static condensers for transmission line correction.

Static stability limits and the application of synchronous condensers at intermediate substations were discussed at length in a paper prepared by C. F. Wagner and R. D. Evans of the Westinghouse Electric & Manufacturing Company, Pittsburgh. According to the authors there have been several proposals for increasing the stability limits of power systems, but the proposal of greatest promise is the use of the intermediate synchronous condenser station through which it is theoretically possible to make feasible the transmission of 60-cycle energy to substantially unlimited distances and which practically can be used to advantage to increase the stable capacity of a given long distance, high-tension transmission system, within certain definite economic limitations. This paper was presented by R. D. Evans and according to him the results of calculations of the stability of practical transmission lines indicate that large increases in static stability limits are obtainable with intermediate condensers. Discussion offered by Mr. Alger pointed out that according to the equations in Evans' paper it would require 4 kva. of synchronous condenser capacity to provide an additional 1 kva. in transmission line capacity. In answering this discussion Mr. Evans stated that this was essentially true when a transmission line was operating at absolutely full capacity, but that usually transmission lines operated under conditions of partial load.

Carrier Current Developments

Features incident to the use of high-tension transmission lines for the transmission of carrier-current impulses were treated from two different angles. In a paper on coupling capacitors for carrier-current application, T. A. E. Belt, engineering department, General Electric Company, Schenectady, outlined present developments. The development of coupling capacitors to replace the long coupling antennae has made possible material reduction in the amount of carrier input to the line without reducing the strength of the received signal. There are four distinct types of coupling capacitors now manufactured in the United States; mica, porcelain, oil-filled cables, and oil-filled tanks. The latter two are new developments and of these the author limited himself to a description of the oil-filled cable type of capacitor. This type consists essentially of a section of lead-covered cable bent into a horseshoe loop, 4 ft. or so across. The core ends are joined together and attached directly to the transmission conductor. The lead sheath of the cable forms the other side of the capacitor and is connected to the output side of the carrier-current apparatus. This makes a compact installation weighing approximately 1,000 lb. or so and one which is capable of attachment to almost any steel bus structure.

The other paper dealing with the carrier-current and its possible uses was presented by A. S. Fitzgerald, radio engineering department, General Electric Company, Schenectady, describing a carrier-current pilot system of transmission line protection. This scheme is essentially the application of the well known pilot wire or differential system of protection directly to a section of high-tension transmission line, using carrier-current impulses upon the line conductors in place of the metallic conductors commonly used as pilot wires. According to the author this system will furnish protection substantially equivalent to that which may be obtained with a pilot-wire system provided that the lowest phase-fault current at which it is desired to operate is not less than the normal rated line current. In the case of ground faults it is possible to obtain operation at current values of less than full load. This is another notable application of the 3-element vacuum tube. Satisfactory tests on this equipment were made on a 66-kv. line about 30 miles in length.

Lightning

Of particular interest to the oil industry is the question of the protection of tank farms from fires caused by lightning discharges. Prior to the three major oil fires which occurred in California during April of 1926, resulting in the loss of several lives and $20,000,000 worth of property, there was no serious consideration given to the question of lightning protection for oil storage tanks because it was cheaper to buy insurance than it was to carry on research investigations. However, as a result of the heavy property loss incident to those fires, insurance rates on oil storage farms increased materially and, further, there was a recognition of the fact that the payment of insurance indemnity cannot compenstate for the economic loss of burned oil.

In a paper prepared by R. W. Sorensen, J. H. Hamilton and C. D. Hayward of the California Institute of Technology, Pasadena, was given an outline of the work done in connection with the planning of a protection scheme. This work shows that the annual number of storms at any given lo-

A group of the delegates attending the sixteenth annual Pacific Coast Convention

cation is approximately a constant. Further, it is shown that the dielectric property of oil has no influence in causin lightning or inducing it to strike oil in storage. Tests conducted by the authors indicate that excellent protection may be obtained by towers properly installed but that they do not indicate absolute immunity against lightning hits. It is suggested that the radius of the area to be protected not exceed 2½ times the height of the tower to insure reasonable prevention of hits within this area. The authors recommend a further intensive field and laboratory study of this particular subject.

E. R. Schaeffer, Johns-Manville, Inc., New York, in his paper outlined the operating experiences of various oil companies and gave a record of several hundred installations made over a period of about three years. He considers laboratory work to be valuable and necessary but believes that it is unwise to rely too completely upon it. The author advocates a grid or radial system of wires placed some 12 ft. above the roof of the oil reservoir as offering the best possible protection against lightning strokes. He further states that, since the seat of the charge under a storm cloud is largely on pipe lines, tanks and other metal parts in the oil field, lightning devices should be securely attached to such structures. He claims that a network of pipe lines at or near the ground surface makes a far better ground for lightning protection towers than does a single shaft driven vertically downward to permanent moisture.

Space Charge

A qualitative analysis of the nature of space charge created around a conductor in corona, particularly with respect to relative magnitudes and polarities rather than to actual quantitative measurements, was described in a paper prepared by J. S. Carroll and J. T. Lusignan of Stanford University. This work represents the principal work on the study of corona carried on in the Ryan high-tension laboratory during the past year. In certain tests it was found that a decided rectifying effect was discernible in the space about the conductor in corona, in that the region was built up to a uni-directional potential above ground, the magnitude and polarity of this potential depending upon the voltage applied. This rectification, which evidently is caused by some differential action entering into the ionization process, was of a positive sign at the start of corona, but changed over to negative as the voltage was raised still higher. In a corona-loss curve taken on one of the test set-ups it was found that at the same voltage at which the sign of the rectified space charge had reversed there was a break in the curve. This break corresponded to the point above which Peek's quadratic law of corona holds good and below which Peek has suggested the entrance of a probability relation. A field test was made at a span of the 220-kv. Pit River line of the Pacific Gas and Electric Company in order to ascertain the magnitude and polarity of the charge built up about a high-voltage line in actual service. It was found that a negative polarity was present as far as 30 ft. below the conductor. This charge remained negative even when the line voltage was raised to 260 kv., indicating that the line in its normal 220-kv. potential was operating at a point on the corona-loss curve appreciably below that where the break occurs in the curve.

Sphere-Gap for High Frequency

A physical conception of the phenomena involved in the relation between frequency and spark-over voltage in a sphere-gap voltmeter was given by L. E. Reukema of the University of California. The object of the author's research was to make the sphere-gap voltmeter a standard for the measurement of peak values of voltage at high frequency as it now is standard for use at commercial frequencies. Experimental data were obtained from which calibration curves for the sphere-gap voltmeter were plotted for frequencies ranging from 28,000 to 425,000 cycles per sec. for standard conditions of temperature and pressure. These curves cover a voltage range from about 10 to 50 kv. No appreciable change in flash-over voltage required for a given gap setting was shown until a frequency of about 20,000 cycles was reached, from which point a gradual decrease in required flash-over voltage is apparent as the frequency increases from 20,000 to 60,000 cycles. Above the latter point a single curve holds good for all frequencies up to 425,000 cycles per sec., the highest frequency tested. At and above 60,000 cycles per sec. the voltage required to flash across a 1-in. gap is 13 per cent lower than the voltage required for the same gap at 60 cycles for normal atmospheric conditions. In the course of his investigation the author found that by flooding the spheres with ultra-violet light, the voltage required to flash across a given gap at high frequency was decreased by about 3.5 per cent whereas no such effect was found at commercial frequencies.

Telephone Toll Communication

J. N. Chamberlin, outside plant engineer, Pacific Telephone and Telegraph Company, presented a paper describing the advance planning of the telephone toll plant. The author outlined rather completely the surveys and studies made by the telephone companies in developing a comprehensive plan of toll-system development that will take care of future demands as they materialize. The engineering cost-comparison study is most important, particularly in view of the fact that an overhead toll-line cable installation costs about $25,000 per mile, practically the same as a 220-kv. line.

The definite application of engineering analyses and economic considerations incident to telephone toll-line construction was given in a paper prepared by F. O. Wheelock of the Southern California Telephone Company and E. Jacobsen of the American Telephone and Telegraph Company, New York. The authors described the tandem system of handling short-haul toll calls in and about Los Angeles. There are two means of connecting together a group of telephone exchanges. One of these is known as direct trunking, which requires a group of trunk lines from each office to every other office. The second possibility is the tandem system, where a single trunk line from each of a group of offices is carried to a central control point known as a tandem center or office, at which there is installed the necessary means for switching together any desired combination of trunk lines between offices.

of the American Institute of Electrical Engineers, Del Monte, Calif., Sept. 13-16.

Crews of the Portland Electric Power Company made a remarkable record in effecting temporary repairs after a violent storm had disrupted its entire d.c. underground system. Left—Laying temporary cables on Alder Street, Portland. Center—Temporary cables entering substation at Broadway and Alder Streets through window. Right—Looking up Alder Street from near manhole at Sixth toward substation at Broadway showing temporary troughs for cables.

Utility Sets Record Repairing Storm Damage to System

Remarkable speed in effecting temporary repairs was recorded by the organization of the Portland Electric Power Company, Portland, on the evening of Sept. 6, after a violent storm had put the entire d.c. underground system out of commission. A violent downpour accompanied by an electrical storm blocked the sewer system, causing the runoff to back into a vault on the corner of Sixth and Alder Streets, one block from the Alder Street substation which is the source of the underground system. Cable insulation, weakened largely by heat due to the proximity of a steam heat line, broke down, causing a short circuit which resulted in a fire that destroyed all connections in the vault and much of the cable radiating from it. Flames and smoke poured out from the manhole, and persisted until subdued by the fire department.

The vault in which the fire occurred contained thirty-one 250-volt d.c. feeders, five 11-kv., 3-phase a.c. lines, one 600-volt d.c. railway feeder, twenty-four secondary mains consisting of d.c. and single and 3-phase a.c., a 2,300-volt junction box, a number of service cables, and a 30-pair telephone cable.

The destruction of this equipment caused the worst breakdown in the seventeen years existence of the d.c. underground system. Temporary repairs were commenced immediately. In one hour and twenty minutes two 250-volt d.c. feeders, isolated from the rest of the system, were closed to supply service to two evening newspapers; railway service was completely restored in two hours, while in less than three hours the d.c. service west of the substation and the a.c. underground were brought in. Temporary repairs were continued through the night and the following day, and by 10 o'clock in the morning 80 per cent of the 250-volt d.c. service had been restored, while by evening of that day practically all service was back to normal.

Repairs were effected by tapping the 250-volt bus in the substation, bringing the cables out through the window across the sidewalk and down the curb line of the street to the manhole. These cables were laid in a wooden trough and covered to permit traffic to cross over them. The 15,000 ft. of cable used in this repair work were procured by combing the city for 500,000 and 1,000,000-circ.mil, rubber-covered and weatherproof wire. Permanent repairs, which will take three months to complete, will be effected by sinking a new manhole at Sixth and Alder Streets, but across the street from the old manhole, and tapping the circuits between the new and the old manholes.

To Regulate Kings River Flow by Balch Afterbay Dam

Construction work on an afterbay dam which will confine waters that have passed through the Balch power house and will be used to regulate the flow of Kings River so that power uses will not materially alter stream flow in the lower river has been started by the San Joaquin Light & Power Corporation, Fresno, Calif. The project calls for a dam which ultimately will rise 75 ft. above the river bed, but which will be about 65 ft. high at the outset. More than 100 men are working in two shifts on the dam, which is expected to be completed in November. Two needle-type control valves 24 in. in diameter, electrically operated from the power house, will be used to regulate the flow of water from the afterbay.

A diversion tunnel 12 ft. wide, 12 ft. high and 364 ft. long is being used to carry the water around the dam site. This tunnel will act ultimately as a conduit in carrying water from the reservoir back of the dam to power houses below.

City of Los Angeles Authorizes Additional Insurance for Aqueduct.—The City of Los Angeles has taken steps for additional protection of the Los Angeles Aqueduct by authorizing the placing of a $7,500,000 explosion and riot insurance policy on its municipal water system. The council also authorized the Department of Water and Power to have rewritten $15,000,000 in fire insurance on the city's water and power systems.

Mountain States Company Begins Work on 57-kv. Line

Contracting for a block of power from the U.S. Reclamation Service plant at Guernsey, Wyo., sufficient to supply the needs of the territory for some years, the Mountain States Power Company, Tacoma, has completed preliminary surveys and has commenced construction of eighty-five miles of 57-kv. line to bring this power to its Casper, Wyo., system at Parkerton. The new line will pass through Douglas and Glenrock and connect with an existing 33-kv. line extending from Casper to Parkerton.

At present Parkerton and Glenrock are served by the Casper steam plant, the capacity of which would have had to be increased soon to care for the growing demands of the territory. Douglas is served by an isolated plant without transmission connection to outside sources. The new line will not only bring additional needed power capacity to the districts served but also will furnish a reserve source to supplement existing steam plants. The new line also will open up the possibility of irrigation by electric pumping of 20,000 acres adjacent to it.

Personnel Changes Announced by Edison Company

R. C. McFadden, formerly district manager at Inglewood for the Southern California Edison Company, has been transferred to the general office as assistant new business manager. Carl Elgan, district manager at Lindsay, succeeds Mr. McFadden at Inglewood, and H. V. Busby, chief clerk at Santa Barbara, has been promoted to be district manager at Lindsay.

Other changes in the company's commercial organization include the transfer of Frank Hamilton, district manager at Hanford, to Fullerton as district manager succeeding the late R. I. Carruthers who, prior to his death July 9, had been acting district manager at Fullerton. John White from the Inglewood district has been promoted to the district managership of Hanford district.

San Joaquin Company Continues Development Program

Estimates for the building of a new 110-kv. steel pole transmission line between Rio Bravo substation and the Bakersfield steam plant at a cost of more than $130,000 have been approved by the San Joaquin Light & Power Corporation, Fresno. This line will be the completing link in a loop joining the Bakersfield steam plant with the Midway steam plant, the southern distribution center for the main trunk of the power system extending through the heart of the San Joaquin Valley. The construction of the line will be another step in a development program in which $536,000 will be expended in increasing the capacity of substations and transmission lines in the Kern County territory.

The largest single item in the program of improvements is the addition of four 10,000-kw. transformers and a 20,000-kw. synchronous condenser at the Kern oil substation, to cost approximately $330,000. Part of the program has been completed with the installation several weeks ago at the Weed Patch substation of four 3,000-kva. transformers at a cost of $50,000, increasing the plant capacity to approximately 12,000 hp.

Jobbers Set Del Monte Meeting for Oct. 20, 21 and 22

Due to the fact that the California Electragists will hold their meeting at Riverside, Calif., on the same dates as originally had been set for the convention of the Pacific Division of the Electrical Supply Jobbers Association at the Hotel Del Monte, Del Monte, Calif., that is, Oct. 13, 14 and 15, H. L. Harper, chairman of the division, has thought it wise to postpone the jobbers meeting until the following week. Accordingly, Oct. 20, 21 and 22 have been set as the dates of the convention.

The Copper Cup room in the Hotel Del Monte will be dedicated at this convention and the division is planning to make this the biggest meeting of the year, according to Albert H. Elliot, secretary, who is asking that reservations be made as soon as possible.

Presenting

GRAYCO SPEEDWATT

[The Magician of the Age]

IN AN extraordinary and amazing spectacle of thrilling transformations. Changes darkness into light! Transports heat and cold by wire! Operates mills and factories at the touch of a button!

Now playing in one great continuous show, twenty-four hours each day. Outdoor performances nightly in every street. Big displays of light in the business section.

Booked for an unlimited engagement in "The Power of Grays Harbor." Performances in your own home for a few cents a day. Grayco Speedwatt offers more light and power to you!

In this manner was the attenuated gentleman shown in the illustration presented by the Grays Harbor Railway & Light Company of Aberdeen and Hoquiam, Wash., to the public of the Northwest. He was christened by Mrs. Aurvilla Green of the Grays Harbor company.

Personnel of Newly Reorganized S.E.D. Is Announced

Reorganization of the Society for Electrical Development, Inc., on a sound working basis and its establishment in its new relationship to all branches of the industry was accepted Sept. 15 in New York City at three successive meetings, that of the society's members in annual meeting, that of the new board of directors, and that of the newly appointed executive committee.

The complete personnel is as follows:

President—W. W. Freeman, chairman Union Gas & Electric Company, Cincinnati.

Vice-presidents — George E. Cullinan, chairman, executive committee of the Electrical Supply Jobbers Association; C. L. Chamblin, president, Association of Electragists, International; J. E. North, chairman, League Council; Gerard Swope, president, National Electrical Manufacturers Association, and Howard T. Sands, president, National Electric Light Association.

Directors

To represent central-station group—H. T. Sands; J. E. Davidson, chairman, National Commercial Section, N.E.L.A.; Paul S. Clapp, W. W. Freeman, Charles L. Edgar, and John F. Gilchrist.

To represent manufacturer group—Gerard Swope, A. E. Waller, S. L. Nicholson, representing N.E.M.A.; W. E. Sprackling, Fred R. Farmer, H. B. Crouse.

To represent jobber group—G. E. Cullinan, Frank S. Price, representing E.S.J.A.; O. Fred Rost, B. E. Finnuane, W. I. Bickford.

To represent contractor-dealer group—C. L. Chamblin, Laurence W. Davis, W. Creighton Peet, representing A.E.I.; James R. Strong, Joseph A. Fowler, C. M. Beltzhoover.

To represent at-large group—J. Robert Crouse, James H. McGraw, C. A. Ward.

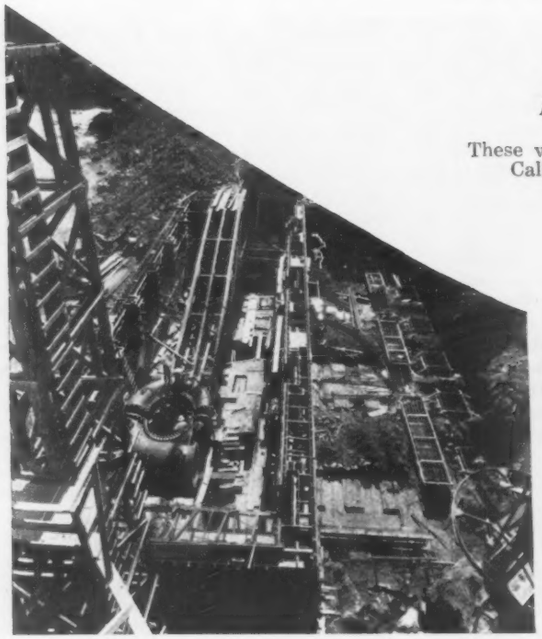
To represent local electrical leagues—J. E. North, H. A. Brooks, R. Bourke Corcoran, David C. Birdsell.

Executive committee, composed of twelve of the directors—C. L. Edgar (chairman), president of the Edison Electric Illuminating Company; L. W. Davis, managing director, Association of Electragists, New York; D. C. Birdsell, Decorative Lamp & Shade Company; George E. Cullinan, vice-president, Graybar Electric Company; J. E. North, chairman, League Council; Paul S. Clapp, managing director, N.E.L.A.; S. L. Nicholson, acting vice-president, Westinghouse Electric & Manufacturing Company; A. E. Waller, managing director, N.E.M.A.; Frank S. Price, president, Pettingell-Andrews Company; James R. Strong, president, Tucker Electrical Construction Company; James H. McGraw, president, McGraw-Hill Company, Inc.; C. A. Ward, president, Ward Motor Vehicle Company. W. W. Freeman is an ex-officio member of this committee.

Managing director—Kenneth A. McIntyre, who since January has been in charge of the staff in acting capacity.

Program of work for the immediate future will deal with the promotion and operation of the National Red Seal Plan; league and field service; news and advertising service; codes and ordinances. Working committees made up of representatives from several branches of the industry have been authorized to deal with these activities.

Seattle Now Terminal of Longest Electrified Railroad.—With the opening of a ten-mile extension to the western terminal of the Chicago, Milwaukee & St. Paul Railroad, Seattle is now a terminal of the longest electrified railroad in the world. In recognition of this event, the mayor of Seattle, Mrs. Bertha K. Landes, piloted the 260-ton electric locomotive hauling the first train into Seattle from Black River Junction, where it formerly had been necessary to change to a steam-driven locomotive.



Pictorial Report of Progress

These views show the status of construction as of Aug. 1 of The California Oregon Power Company's Prospect No. 2 plant on the North Fork of the Rogue River in Oregon. At the left appear the power house substructure and excavation for electrical bay and transformer bench. At the right is shown the construction at the dam, looking downstream at the site.

Personnel Changes Announced by Pacific Power & Light Co.

The resignation of R. J. Jenks, district manager at Lewiston, Idaho, for the Pacific Power & Light Company, Portland, has occasioned a slight shift in the operating personnel of the company and the promotion of five of the organization. H. W. Cooper, formerly district manager at Pasco, Wash., succeeds Mr. Jenks; Roy Skill, formerly district manager at Dayton, Wash., succeeds Mr. Cooper; Roy Dean, formerly manager, Sherman Electric Company, Moro, Ore., succeeds Mr. Skill. The Sherman Electric Company, recently acquired by the Pacific company, will be operated by R. H. Hopper, under the supervision of Glen L. Corey, district manager at The Dalles, Ore. Mr. Jenks will engage in private business at Lewiston and likewise will be retained in consulting capacity in the construction and operation of the company's gas plants.

Study Persistence of Waves Due to Power Plant Operation

Observations of the persistence of waves caused by irregular power plant operation, at the instance of the Federal Power Commission, are to be made on a number of rivers of varying characteristics. Studies recently completed by The California Oregon Power Company show that the waves produced at its Copco plant on the Klamath River are practically undiminished at a distance of 64 miles from the plant and show only a 25 per cent reduction 132 miles away. The gages at the 64-mile and 132-mile stations were read at 30-minute intervals throughout the day and night for a period of six days.

Similar results previously had been noted on the Pit River. That particular study had an important bearing on the commission's action in assuming jurisdiction over the project at Radford, Va., on the New River. The Klamath results tend to support the exceptions taken by the commission's engineers to claims that these impulses disappear a few miles from the plant.

Report on Status of Colorado River Conference

The status of the governors' conference on the allocation of Colorado River water and power that reconvened Sept. 19 briefly is as follows, as this publication goes to press:

Arizona has accepted, with reservations, the plan for division of water between the lower basin states that was submitted by the governors of the upper basin states Aug. 30 and rejected at that time by Arizona. In brief, the plan allots to Arizona 3,000,000 acre-ft. of water annually from the main stream, 4,200,000 to California and 300,000 to Nevada. The last-named state had signified that it was ready to accept the proposal when California and Arizona acted upon it.

California has declined to accept the plan and continued to persist in its demand for its "irreducible minimum" of 4,600,000 acre-ft.

In its statement Arizona states that it will accept the plan if its claims to revenue from federal-built hydroelectric power plants are recognized; if assured of the waters of its tributaries, and if it is not called upon to surrender water for lands below the international boundary. Further, Arizona contends that this acceptance afterwards must not be used against it provided there is no settlement of the river control problems at this conference.

The plans of the three states for water division now are in the hands of the upper basin governors' committee, which will endeavor to effect a satisfactory compromise.

Plans for the allocation of power have been submitted to the committee by Arizona and Nevada. The former's proposal, according to press dispatches, set forth the "broad principles" controlling any development of the river, and held that the state is justified in exacting revenue from federal plants equal to benefits received should the development be by private capital, and thus taxable. Nevada's statement contended that Arizona and Nevada are entitled to an even division upon benefits arising from a dam built on their boundaries. However, Nevada stands ready to concede a third of her power benefits to California if Arizona will do the same, thus giving California a third of the power generated. Arizona opposes this principle, first on the grounds that California is not entitled to any such division, and second, that as most of the fall in the river is in Arizona, that state should not concede half of the power to Nevada. California's power proposal has been submitted, but details have not been published as this paper goes to press.

Much discussion has centered around the so-called states' rights resolution introduced at the previous session by Senator Key Pittman of Nevada, and it was stated that in committee the resolution had received the affirmative vote of every state except California. The resolution provides that states' rights to ownership of lands covered by navigable streams and to sovereignty to all waters within their borders be affirmed by the parley; that states may demand compensation for the use of their lands and waters, and that a state whose land is used by the United States Government incident to the construction of a dam for hydroelectric power may demand prior right to the power.

News Briefs

San Francisco Supervisors Vote to Place on Ballot Proposed Bond Issue for Newark Transmission Line.—The Board of Supervisors of San Francisco on Sept. 19 voted to place before the voters at the November election a proposed bond issue for $2,000,000 to build a transmission line from Newark to San Francisco. Two of the members of the board voted against the proposal on the grounds that it would mean paying interest on a "frozen investment," as the line would be of no use when it was constructed. The line would be used to transmit to San Francisco power generated at the Moccasin plant of the city's Hetch Hetchy project. At the present time under an existing contract the power is delivered to the Pacific Gas and Electric Company at its Newark substation at a yearly rate of $2,000,000. This contract may be terminated by either party on one day's notice.

Publication to Campaign for Adoption of California Assembly Constitutional Amendment.—Under the name of "Water" the California Water Resources Association, with headquarters in San Francisco, in the month of October will commence the publication of a monthly magazine as one of the means for carrying on the campaign for the adoption of Assembly Constitutional Amendment No. 27, which will be submitted to the voters of California at the general election Nov. 6, 1928. This amendment is designed to prevent "the waste or unreasonable use or unreasonable method of use of water," now possible under the existing riparian rights doctrine, and to exercise "the conservation of such waters . . . . . with a view to a reasonable and beneficial use thereof in the interest of the people and for the public welfare."

Puget Sound Company Offers to Light Seattle Streets at $100,000 under City Light Department.—The Puget Sound Power & Light Company of Seattle has made a formal offer to the city council to furnish electric current for street lighting at a cost of $100,000 less than the cost estimated in the budget for 1928. The current is at present furnished by the city light department, and the estimate for next year is $388,000, paid for out of the general fund of the city.

Largest Electrically Driven Passenger Vessel Launched Oct. 1.—The S.S. "California," claimed to be the largest electrically driven passenger vessel in the world, was launched Oct. 1 at Newport News, Va., by the Newport News Shipbuilding & Drydock Company. The ship, which will be used by the Panama Pacific Line between New York and San Francisco, will be electrically equipped throughout.

The basket ball team of the San Joaquin Light & Power Corporation, Fresno, Calif., takes an active part in the work of the Women's Recreation League of that city. Back row, left to right—Genevieve Sawyers, Thelma Cargile, Katherine Krum, Lois Smith, Johnnie Cobb; front row—Myrtle Flake, Hazel Moxay, Dotty Leavitt.

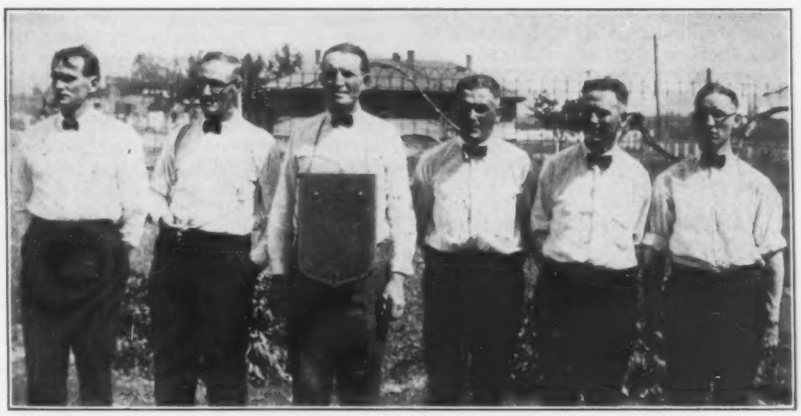
Utility Secures Restraining Order in Rate Dispute.—The Peoples West Coast Hydro-Electric Corporation, Shelton, Wash., has caused to be issued a restraining order preventing the department of public works from forcing the company to put into effect the department's order allowing lower lighting rates at Shelton. The company alleges the department's order amounts to confiscation and is unconstitutional. If compelled to adopt the new valuations prescribed by the department, the company claims its rate return would be reduced from 8 per cent, the fair minimum return allowed for capital employed in similar undertakings, to 2.8 per cent.

Ceremony Commemorates Opening of First Power Plant.—On Sept. 4, forty-five years after Thomas Alva Edison threw the switch which opened the first public electric light and power plant in the world, at 267 Pearl Street, New York, John W. Lieb in commemoration of that opening placed a wreath on the tablet which now marks its site. Dr. Lieb, who is now vice-president and general manager of the New York Edison Company, the great system which has grown from Edison's original venture, worked with Edison in designing and building the Pearl Street station. The first plant housed in an old four-story building, a short distance south of Brooklyn Bridge, ran fourteen months without a breakdown, which was considered a remarkable record.

World Power Conference to Be Held in Germany in 1930.—At a meeting of the international executive committee in Cernobbia, Italy, in September, it was decided that the next World Power Conference will be held in Germany in 1930. It also was decided to hold a sectional meeting in Tokio in 1929. Tentative arrangements had been made to hold the next conference in Italy, but the Italian committee explained that the conference could be held more profitably in Italy at a later date when its hydroelectric program will have developed somewhat further.

Foshay Company Buys Idaho Utility.—The Northwest Light & Power Company, which serves Wallace, Idaho, and adjacent territory with electric light, power and water, recently was purchased by the W. B. Foshay Company.

Experts in First Aid



The annual First Aid Contest held recently by the Pacific Power & Light Company at Pasco, Wash., was won by the Walla Walla team with a total score or 98.2 per cent, in competition with teams representing ten other company districts. Reading from left to right, the team consists of S. A. Mullen, lineman; E. O. Daves, arc patrolman; Fred Fuller (captain), lineman; C. C. Hoyt, meterman; E. G. Argo, meterman; and H. A. Milby, storekeeper.

This First Aid contest, as conducted annually by the Pacific Power & Light Company, is carried out on a more elaborate scale than any similar contest among the companies in the Northwest and has proved to be a great stimulus in promoting safety work within the company.

California Railroad Commission Appoints Expert in Telephone Rate Case. —Lester S. Ready, formerly vice-chairman of the board of directors of the Key System Transit Company, Oakland, Calif., and until recently president of that company, has been named by the California Railroad Commission to take charge of the preparation and presentation of the commission's testimony and evidence in the pending rate case of The Pacific Telephone and Telegraph Company. Mr. Ready, who recently resigned from the Key System company in order to engage in practice as consulting engineer, was for four years chief engineer of the Railroad Commission and had been connected with its engineering department for thirteen years.

Pacific Coast Electrical Association

Report of Engineering Section's First Group Meetings

The first group meetings of the Engineering Section, P.C.E.A., were held in the Los Angeles Gas and Electric Corporation Building Aug. 31-Sept. 2. Meetings were well attended and the discussions lively. Inspection trips to points of particular interest to the various committees added to the value of the session discussions. These trips included the Southern California Edison steam plant at Long Beach, the Los Angeles Gas and Electric steam plant at Seal Beach, the underground systems of that corporation and of the Los Angeles Bureau of Power and Light, and substations in and around Los Angeles.

At the session of the executive committee Sept. 1 the appointments of committee vice-chairmen were confirmed. These included F. S. Thomas, Coast Valleys Gas & Electric Company, accident prevention committee; H. T. Sutcliffe, Pacific Gas and Electric Company, electrical apparatus committee; H. K. Fox, San Joaquin Light & Power Corporation, hydraulic power committee; R. S. Daniels, The California Oregon Power Company, inductive co-ordination committee; L. L. Conrad, Southern California Edison Company, meter committee; R. G. Boyles, Southern California Edison Company, overhead systems committee; F. R. Knight, Los Angeles Gas and Electric Corporation, prime movers committee; and K. B. Ayers, San Diego Consolidated Gas & Electric Company, underground systems committee.

Accident Prevention Committee

By W. E. Row

Southern California Edison Company, Chairman

The first meeting of the accident prevention committee for the current year was given over principally to a preliminary discussion of subjects selected for study during the year.

It will be the aim of the committee this year to assist the several companies in local safety committee work. Co-operation on a practical basis is to be sought.

Also, emphasis will be placed on the importance of educational efforts to bring forcibly to the attention of superintendents, foremen, and others in charge of work, their direct responsibility for accident prevention.

Electrical Apparatus Committee

By R. H. Halpenny

The Southern Sierras Power Company, Chairman

Discussion concerning transformers and regulators indicated that it will be advisable to give special attention to the use of tap changers under load. The extent to which high-voltage transformers should be made self-protecting against lightning also was given consideration. Trends of transformer cooling practice, use of 3-phase vs. single-phase units, protection of regulators against short circuit currents and new and unusual experiences also were touched upon.

A consideration of lightning arresters showed the desirability of studying the extent of lightning damage to electrical apparatus in the Pacific Coast area. Also it is proposed to study storm paths and storm frequency. The economic justification of lightning protection and the investigation of available types of arresters were suggested as topics of interest.

Discussion of fire prevention brought out the desirability of considering the matter of fire prevention in the design of station layout. Protection of special kinds of apparatus, types of available equipment, necessity for inspection of fire prevention equipment and for the training of operating personnel in its proper use received attention.

Developments in the manufacture, application and operation of oil circuit breakers were touched upon. The present state of the vacuum circuit breaker was outlined.

Relays proved to be a subject of more than usual interest. The condenser and vacuum tube relay received mention, also other new developments both in manufacture and application.

The new subcommittee on load dispatching is to start its work by collecting information concerning the varying functions of load dispatchers on different systems. This information will form the basis for a study of dispatching problems.

Operating methods, routine and experiences present a fertile field for study and a very complete outline has been prepared for the guidance of this subcommittee in the year's work.

The subcommittee on operating personnel proposes to consider such topics as the selection of employees, training, discipline, records, promotion, etc.

Hydraulic Power Committee

By E. A. Crellin

Pacific Gas and Electric Company, Chairman

The first session was opened by the reading of a letter from Byron E. White, chairman, Hydraulic Power National Committee, the gist of which was that the national organization endorses the work of the local section and considers such work to be of national scope and importance. Reports from the subcommittee of four carry-over subjects were read and discussed, namely: water-hammer tests, penstock painting, mechanical reliability of hydroelectric units, and silt deposits. Four new subjects were reported upon and discussed in open meeting: automatic hydro plants, spillway gates, power-house cranes, and flumes.

The second session was devoted to a description of the Mokelumne River Development of the Pacific Gas and Electric Company presented by I. C. Steele, and a paper by E. M. Breed of the Pelton Water Wheel Company, covering practical aspects of the problems of deterioration of under-water metal surfaces of hydraulic power equipment.

At the third session I. C. Steele gave his report on pressure tunnels, based upon data received from member companies. Reference was made to the report of the world conference on tunnels held in Switzerland.

The vice-chairman of the committee is to act as a special committee of one to be on the lookout for and to select new subjects of timely interest which will form the foundation of the committee's next year's work.

Inductive Co-ordination Committee

By J. O. Binney

Southern California Edison Company, Chairman

Discussion of current cases of inductive co-ordination matters disclosed the fact that remedial measures and their application to cases of inductive interference resulting from normal exposures were well in hand. It was suggested that the committee make special surveys of inductive interference cases resulting from transient disturbances.

Member company practices in locating cases of radio interference and in correcting them were tabulated and discussed at length. It was agreed that a more systematic method of accounting should be effected. Also it is advisable to secure the co-operation of the radio dealers in helping to promote better public relations.

Power company communication systems were discussed along the lines of continuity of service rendered, reliability of protection, effectiveness of transposition and the methods employed in testing and supervising. Inasmuch as the individual systems vary widely it was suggested that the committee by presenting technical papers on certain phases of the subject could do much in improving existing conditions.

Meter Committee

By W. N. Lindblad

Pacific Gas and Electric Company, Chairman

Tentative arrangements have been made for the holding of two short courses for metermen, one at the California Institute of Technology, Pasadena, and one at the University of California, Berkeley. It was suggested that men other than those strictly connected with meter work might find it well worth while to attend these courses.

The best methods of contacting with and assisting in the work of the national meter committee were discussed.

A brief description of several "Special Tests and Investigations" was given. These will be submitted later as subcommittee reports. Other subjects considered included several interesting descriptions of boxes for transporting instruments; the question of proper test periods for watthour meters; clocks and timing devices and their maintenance; several new developments in testing accessories; and the use of 3-element meters for metering 4-wire, 3-phase service.

The metering of kva-hr. and kva. demand appears to be a timely study. The subject of "Uniform Test Facilities" has been added to this committee's work for this year.

Overhead Systems Committee

By H. H. Minor

San Joaquin Light & Power Corporation, Chairman

Continuation of the study made last year on corrosion of tower footings was broadened to include corrosion of all metals used in overhead line construction, including conductors and miscellaneous hardware.

The subcommittee on joint pole practice and construction rules discussed the recent tentative order of the Railroad Commission covering overhead line construction and presented a report covering changes in the proposal that seemed advisable. Upon motion this was accepted as the recommendation of the overhead systems committee of the P.C.E.A. and ordered forwarded to the commission.

A subcommittee on pole-line structures and devices and their maintenance reported upon its proposed activities. It was decided to include in this study the comparative costs and advantages of steel poles and wood poles for certain classes of distribution lines.

A study of transformer-loading is to be included in the year's work. This will take into account the load factors of various types of installations for large office buildings, theaters, hotels and other concentrated loads. Methods of checking loads on transformers also will be covered.

It was decided to include a study of the actual temperatures of the conductors in over-head lines when heavily loaded during times of extreme ambient temperatures. This condition is particularly important in figuring sags, in order to arrive at proper ground clearances for long spans in transmission line design.

The last subject considered was the common-ground neutral of primary and secondary circuits. This study is to be handled by a joint subcommittee of the overhead systems committee and the inductive co-ordination committee. The N.E.L.A. and the A.T. & T. are to assist in some experiments to determine the effect of such a

system upon the operation of communication circuits. Several areas have been tentatively suggested for this experimental work. Certain of these will be selected and actual conditions and results will be noted. The intention of this study is to arrive at a solution of this greatly debated question.

Underground Systems Committee

By H. H. BUELL

Pacific Gas and Electric Company, Chairman

Discussion was devoted to the 16 subjects which have been assigned (one each) to as many members of the committee. Final reports on these studies are to be presented at the Engineering Section group meetings in January and April, 1928. Subjects considered were as follows:

1. Testing of lead-covered cables. Discussion of various methods of determining condition of cables during operation and of locating faults in cables after failure. Routine tests.
2. Electrolysis as it affects underground lead-covered cables. This report is a continuation from last year.
3. Manhole castings and covers. A study of standards adopted by various companies with a view to introducing the desirable features of each.
4. Determination of temperatures of underground cables. A continuation of the report of last year.
5. Ventilation of transformer vaults. Methods and data on present practice.
6. Joint use of duct lines and manholes by power and signal companies. The purpose of this report is to bring about possible reduction in cost of such construction, especially in residential areas.
7. Advantages and disadvantages of various kinds of ducts, such as fiber, clay, concrete, etc., as regards heat dissipation, cost and other features.
8. Cable terminal improvement, both high and low-voltage and particularly service voltages, to prevent damage to cables by moisture.
9. High-voltage direct distribution. A discussion of operating practice, experience and equipment as now employed by one California utility.
10. Telephone communication between manholes and substations to expedite the correction of trouble.
11. Bonding and grounding underground systems and cables. Methods and practice now employed by utilities.
12. Marking cables and equipment for identification as a safety measure.
13. Operation of "substructure committees" in California municipalities.
14. New ideas in the construction and operation of underground systems. Kinks to reduce cost, prevent interruptions, reduce obstruction of streets, etc.
15. Operation of a star-star underground system. A consideration of systems now being installed by Eastern utilities as a.c. networks.
16. High-voltage cables. Advancements in the art of manufacture and operation.

Prime Movers Committee

By F. G. PHILO

Southern California Edison Company, Chairman

Discussing boilers, furnaces and accessories, the chairman suggested that a study be made of water cooled furnaces and the tendency in furnace design; of radiant and convection superheaters, their location and temperatures to be expected over a wide range of capacity; also some study of soot blowers.

Regarding boiler and turbine instruments, it was thought that a study should be made of equipment for temperature measurements, such as the thermocouple and resistance types. Also, the influence of larger units on the expenditure warranted for instruments should be considered.

Investigations on the burning of liquid and gaseous fuels should be confined to mechanical burners because the steam atomizing type already has been well covered. Some study of gas distributing systems also should be made.

Scott Jensen suggested that the work of the condenser committee should be divided into two parts, one dealing with the physical problems such as cleaning and corrosion, and the other with cost analysis. C. W. Wiggins suggested that some features of condenser design might be included because conditions are different in the West.

The subjects of caustic embrittlement, and methods of tests and treatment have become of especial interest to local members and further information will be brought to light this year.

Heat balance and auxiliaries will be studied along the lines pursued last year, but some electrical men will be added to this committee as the electrical features of auxiliary equipment warrant careful study.

Three new subcommittees were formed this year and it was hoped that these committees would develop closer relations between the operating men and bring to light many kinks that would be useful to all.

Constructive Program for Year's Work Planned by Commercial Section

Indicating the increasing importance of the commercial phase of the industry's business, more than 175 men gathered in Los Angeles Sept. 21-22 to launch the current year's program of the Commercial Section of the Pacific Coast Electrical Association. Attendance and interest displayed in formulating the program of the various committees augur well for the section's success during the year.

R. H. Ballard, vice-president and general manager, Southern California Edison Company, sounded the keynote of the section program when he stated that a new commercial era has dawned and that it is the responsibility of the commercial men to take advantage of the opportunities offered. He pointed out that during the past decade the engineering and financial operations of the power companies have become almost automatic, giving the commercial men a productive machine with which to work. Load factors of 60 per cent such as prevail at the present time in this territory are not to the credit of the industry, he stated, particularly when salesmanship can build these load factors to 80 per cent, at the same time giving tremendous impetus to the industry's financing. For this new commercial era to be successful, he said that chief executives must give more attention to commercial affairs and the commercial men themselves must recognize that they can no longer give so much attention to public relations and stock-selling but must realize that their problem is to increase the usage by present consumers and to sell customers on the new applications for electricity that are constantly being brought out.

With flush production and little or no inter-company sales, operating executives are no longer worrying about where to get power, but where to sell it, was the opinion advanced by F. B. Lewis, assistant general manager of the Southern California Edison Company. Oil field electrification has resulted in the addition of between 20,000 and 30,000 hp. to the lines of his company this year. This and railway electrification are two of the big fields for additional loads to which the industry in California can look.

At the various committee meetings held during the two days complete committee programs for the year were launched. The most important undertaking of the section is the work of the educational committee of the Lighting Bureau. This committee will tell the story of the proper use of artificial light in the home and in the school to eighty-five Parent-Teacher Associations and thirty-six women's clubs throughout the state. Talks have been scheduled in twenty-seven cities, and eighteen speakers will give illustrated lectures during November. This is to be followed by a general mailing of 1,500,000 pamphlets on better lighting.

The lighting campaign committee will analyze successful lighting campaigns and report on such items as cost, quotas, advertising, organization and the like. The street and highway lighting committee will present its last year's report on highway lighting to the State Highway Commission within a short time. It also will study street lighting progress during the past two years. The commercial lighting committee will conduct a series of tests in five cities to show the improved advertising value of better window lighting, working in conjunction with retail merchants' associations. The sign lighting committee will make a historic survey of sign and floodlighting and prepare recommendations for selling floodlighting.

The merchandising committee will study methods of stimulating the sale of appliances through retail outlets with the idea of improving trade relations. It also will conduct a survey of the use of appliances by the industry itself. The electric air heating committee will work for closer co-ordination between the various agencies within the heating industry. The refrigeration committee will attempt to bring about co-operation between the refrigeration sales outlets for the purpose of stabilizing sales methods and ethics.

The electric range committee will undertake four studies. A subcommittee will study range wiring standards and costs in incorporated cities in California and the Pacific Northwest for the purpose of recommending uniform standards that will reduce the cost of range wiring in old houses. Another subcommittee will prepare plans for a campaign to be held during the association year to sell ranges to the industry itself. A third committee will work to give greater publicity to the Red Seal activity and particularly to induce the industry to give greater consideration to the Red Seal Plan. The fourth study will constitute a survey of the methods used by various central stations to increase the use of ranges already on the lines through the services of demonstrators and home service experts. The commercial cooking committee will gather data on the use and operation of commercial cooking equipment already on the lines of California companies for the preparation of a manual to be used by salesmen.

The agricultural power committee plans to publish a sales and information manual on agricultural applications of electricity. The competitive power committee will study competitive

power markets, particularly in the oil fields, the lumber industry and among hotels and institutions. The industrial heating committee will gather data on the connected load, consumption and revenue of various types of heating installations for the purpose of bringing up to date the manual issued two years ago.

The customer relations committee plans to conduct two essay contests similar to those held during the past two years. The first will be on a subject such as "What Are the Three Most Important Factors of Customer Relations and Why?" The second will be on drafting a code of ethics for the industry. Prizes aggregating $2,500 will be given in the two contests.

The conclave closed with an open meeting at which the speakers were Judge C. W. Appleton, vice-president in charge of general relations, General Electric Company, New York, and E. C. Hensel, director of advertising, Daily Illustrated News, Los Angeles. Judge Appleton, speaking on the subject, "The Opportunities of the New Commercial Era," discussed the markets for electric power that have not received cultivation. He declared that the power companies should be the leaders in promoting creative selling plans and co-operating with all electrical sales agencies in a community. Mr. Hensel gave an inspirational sales talk entitled, "The Three G's of Selling."

The entertainment feature of the conclave was a dinner Thursday night at which returns of the Tunney-Dempsey fight were broadcast, and a program sponsored by the jobbers, manufacturers and central stations was presented by Glenn Rice of KNX and several radio artists.

Executive Committee to Meet.—A meeting of the executive committee, P.C.E.A., has been set for Oct. 28 in Los Angeles.

Radio as Good-Will Builder Topic of Advertising Section

That radio broadcasting can be used to good purpose by power companies in building good will was the opinion advanced by Carl Haviland, commercial manager of KFI, at a meeting of the Advertising-Publicity Section of the Pacific Coast Electrical Association at Los Angeles, Sept. 21. In discussing the possibilities of broadcasting he related the experiences of several Eastern central stations, notably the New York Edison Company, which is spending approximately $50,000 annually on this form of good-will building.

Mr. Haviland pointed out that radio cannot be used exclusively as a direct form of advertising to build sales. It does, however, create good will that results in sales. It makes possible, he stated, personal, word-of-mouth contact of the type desired in power company public relations work. The advertising results of broadcasting are intangible and are difficult to check, he pointed out. He quoted estimates of the National Broadcasting Company that there are approximately 300,000 radio sets in and around Los Angeles and 250,000 in the San Francisco territory. His remarks were substantiated by experiences with broadcasting cited by Frank Hobart, advertising manager of the California Petroleum Company.

At a business session in the morning the section reviewed the co-operative industry advertising program of the California Electrical Bureau as presented by Norman Stern of the Johnston-Ayres Company and recommended to the Public Relations Section that the program be continued in 1928.

Transportation Section to Meet Oct. 21-22.—A meeting of the Transportation Section, P.C.E.A., will be held in the club rooms of the Edison Building, Los Angeles, Oct. 21-22.

Northwest Electric Light & Power Association

Intensive Campaign Planned by Lighting Committee

With the committee personnel chosen, the speakers trained, and the equipment procured, the home and industrial lighting committee of the Commercial Section of the Northwest Electric Light & Power Association has practically completed arrangements for an extensive coverage of the territory with talks on lighting before business men's luncheon clubs. Fred Zaugg, illuminating engineer, Northwestern Electric Company, Portland, chairman of the committee, and Clark Baker, National Lamp Works, Oakland, Calif., under whose direction the talk has been prepared, have made a preliminary trip over the territory for the purpose of determining the needs of the territory in personnel and equipment and to train the speakers.

The activity is similar to that carried on in California last year by the P.C.E.A. under Mr. Baker's direction, and consists in presenting the lighting talk with demonstration before the leading luncheon clubs in the cities and larger towns in the territory. The tentative program in the Northwest is as follows: Salt Lake City, five talks; Ogden, Utah, three; Boise, three; Spokane, five; Yakima, Wash., two; Walla Walla, Wash., two; Seattle, five or six; Everett, Wash., two; Bellingham, Wash., two; Portland, five or six; Salem, Ore., two; Albany, Ore., two; Eugene, Ore., two; and perhaps others.

The committeemen chosen to contact with the clubs and arrange for the talks in their respective localities are: Portland—George E. Sullivan, Portland Electric Power Company; Seattle—R. M. Boykin, Puget Sound Power & Light Company; Spokane—J. E. E. Royer, The Washington Water Power Company; Boise—L. W. Brainard, Idaho Power Company; Salt Lake—R. M. Bleak, Utah Power & Light Company; Yakima—B. P. Bailey, Pacific Power & Light Company; Walla Walla—R. B. Bragg, Pacific Power & Light Company; Salem—W. M. Hamilton, Portland Electric Power Company; Albany—G. L. Jackson, Mountain States Power Company; and Everett—George Newell, Puget Sound Power & Light Company.

Among the speakers chosen to give talks in their territories are: Portland—Walter Potter, National Lamp Works, and A. T. Bergeron, Miller Company; Seattle—L. E. Karrer, Puget Sound Power & Light Company, and J. Kelly—Graybar Electric Company; Spokane—L. K. Snyder, The Washington Water Power Company; Salt Lake—K. W. Browning, Utah Power & Light Company and Elmer Johnson, Capital Electric Company; and Boise—George Kinkaid, Idaho Power Company. These men have been trained in the talk and in its demonstration, the demonstrating equipment has been made, and arrangements are going forward to schedule the talks.

Engineering Section Executive Committee Holds Meeting

The possibility of the adoption in the State of Washington of the National Safety Code governing outdoor construction, the recommendation from the N.E.L.A. that the A.S.T.M. specifications for hard and medium drawn copper wire and cable be changed before their adoption by the American Standards Committee, and the possibility of securing a high-voltage testing laboratory at the Oregon Agricultural College were among important matters discussed at a meeting of the executive committee of the Engineering Section, Northwest Electric Light & Power Association, at Portland, Sept. 9-10. These matters were left with appropriate committees to be followed up and acted upon. In addition, the matter of co-operating with the national overhead systems committee to secure data from the Northwest on the loading strength of aerial lines was placed in the hands of H. H. Schoolfield, chief engineer, Pacific Power & Light Company, Portland.

D. W. Proebstel, superintendent of tests, Portland Electric Power Company, was elected vice-chairman of the section, and M. V. Watson, general manager, Peoples West Coast Hydro-Electric Corporation, Portland, and J. B. Brokaw, chief engineer, Eastern Oregon Light & Power Company, Baker, Ore., were added to the executive committee as members at large.

Meetings

Coming Events

California Electragists.—Annual convention at Mission Inn, Riverside, Calif., Oct. 14-15.

Illuminating Engineering Society.—Annual convention at Edgewater Beach Hotel, Chicago, Oct. 11-14.

Pacific Coast Electrical Association.—Meeting of Transportation Section in club rooms of Edison Building, Los Angeles, Oct. 21-22.

Executive committee meeting in Los Angeles, Oct. 28.

Pacific Division, Electrical Supply Jobbers Association.—Convention at Hotel Del Monte, Del Monte, Calif., Oct. 20-22.

Rocky Mountain Division, N.E.L.A.—Coloralo Public Service Association.—Joint annual convention at Colorado Springs, Colo., Oct. 17-20.

California Electrical Bureau Committee Holds Meeting

Plans were laid to arouse a greater interest in the activities of the California Electrical Bureau at a meeting of the advisory committee held in Los Angeles, Aug. 26.

Among the reports made at the meeting was one by C. J. Geisbush on the recent national convention of the Electragists at St. Louis and another on the activities of the California Electragists.

V. W. Hartley, executive secretary, reported upon activities of the bureau, stating that while the prime purpose of the bureau is the promotion of the Red Seal Plan the field men find many opportunities as they travel through their territories to further other activities which are of material benefit to the industry.

S. E. Gates reported upon the meeting of representatives of various electrical leagues and clubs which had been held for the purpose of discussing the co-ordination of these associations as local chapters under a parent body. He stated that the sixteen representatives present expressed their approval of such a movement and had elected a chairman and secretary, authorizing them to proceed with preliminary plans which could be submitted to the leagues for approval of the members.

The committee endorsed the plan of inviting Mr. Ripley of the General Electric Company to tour California, under the joint sponsorship of the bureau and the Pacific Coast Electrical Association, and present an illustrated lecture at such meetings as could be arranged for him within the electrical fraternity at schools and colleges and through Chambers of Commerce. The committee also endorsed the re-fixturing campaign now being sponsored by the N.E.L.A.

P. H. Booth was reappointed chairman of the finance committee.

Much Discussion at Annual Convention of Wyoming Utilities Association

INFORMAL discussion predominated over speeches and reading of papers at the annual convention of the Wyoming Utilities Association, held in Cheyenne Aug. 15-16. In adherence to the policy established two years ago the sessions were open to the public.

J. G. KEEGAN

W. D. JOHNSTON

The convention was not confined to Wyoming utility representatives. Several Colorado men took part in the proceedings, including Clare N. Stannard, vice-president and general manager, and V. L. Board, general superintendent, Public Service Company of Colorado, Denver; W. C. Sterne, president, Rocky Mountain Division, National Electric Light Association; A. C. Cornell, Graybar Electric Company; J. J. Cooper, Mountain Electric Company; J. F. Greenawalt, Mountain States Telephone and Telegraph Company; and George E. Lewis, Rocky Mountain Committee on Public Utility Information, all of Denver.

George Shaw, general counsel, Public Service Company of Colorado, spoke on "Government in Business." He voiced the conviction that it is only a question of time until "the butcher, the baker and candlestick maker" are going to be governmentally controlled unless there is a cessation of the present tendency for the government to go into private business.

Mr. Sterne decried the apologetic attitude assumed by so many public utility representatives. He pointed out that the public utilities of the nation probably have less to apologize for as an industry than any other line of business.

During his address V. L. Board asserted that "it takes more than fancy wall cards bearing platitudes on courtesy to establish and maintain good public relations. And it requires more than the efforts of the executives of a company to keep up a proper contact with the people. This effort must extend to every employee."

Others who participated in the various discussions, which greatly outnumbered the talks and reading of papers, were M. H. Soule, Western Public Service Company, Laramie; R. E. Richardson, Cross Gas Company, Lovell; C. L. Titus, sales manager, Mountain States Telephone and Telegraph Company, Cheyenne; W. D. Johnston, Mountain States Power Company, Casper; L. J. Meyer, Mountain States Telephone and Telegraph Company, Cheyenne; J. MacIntyre, New York Oil Company, Casper; Wilford O'Leary, attorney and engineering expert, Cheyenne; J. J. Withrow, Sheridan County Electric Company, Sheridan; H. L. Williams and J. J. Jacabucci, Utah Power & Light Company.

The following officers were elected for the ensuing year: President—J. G. Keegan, Cheyenne Light, Fuel & Power Company, Cheyenne, Wyo.; first vice-president—W. D. Johnston, Mountain States Power Company, Casper, Wyo.; second vice-president—M. H. Soule, Western Public Service Company, Laramie, Wyo.; secretary-treasurer—L. J. Meyer, Mountain States Telephone and Telegraph Company, Cheyenne, Wyo. The executive committee consists of the officers named and H. L. Williams, Utah Power & Light Company, Evanston, Wyo.; J. J. Jacabucci, Utah Power & Light Company, Green River, Wyo.; and J. J. Withrow, Sheridan Electric Company, Sheridan, Wyo.

Convention of Rocky Mountain NE.L.A. Oct. 17-20

The twenty-fourth annual convention of the Colorado Public Service Association and the eighth annual convention of the Rocky Mountain Division of the National Electric Light Association will be held in joint session at the Hotel Broadmoor, Colorado Springs, Colo., Oct. 17-20.

The various committees in charge of arrangements have been very busy, with the result that an interesting program is promised and plans for recreation include golfing, swimming, boating and special motor trips.

Contractors, Dealers and Inspectors

Tentative Program for Electragists' Riverside Convention Announced

ALTHOUGH last minute arrangements may cause slight changes, the program for the second annual convention of the California Electragists, at the Mission Inn, Riverside, has been definitely decided upon and will follow the lines outlined here.

There will be four business sessions and the banquet. At the first session, Friday morning, two feature addresses will be given. The Friday afternoon session will take up reports of the sections and committees.

Saturday morning's session will start with a general industry conference, representatives of each branch of the industry giving an interpretation of their respective positions. This will be followed by a number of short addresses designed to arouse interest and point to possible lines of market development. The Saturday afternoon session is one in which members of the association will find interest, and will deal with secretaries' reports and discussions of problems involving Electragist principles. A banquet that night will close the convention.

Specifically, in so far as outline is concerned, the tentative program has been announced as follows:

Friday, October 14

Morning

9:00 Registration.
10:00 President's opening remarks.—Clyde L. Chamblin.
10:15 "The Through-the-Dealer Merchandising Plan."—H. H. Courtright, president and manager, Valley Electrical Supply Company, Fresno.
11:30 "Maybe I Shouldn't Have Mentioned It," an evaluation of the uses of trade publications.—W. A. Cyr, associate editor, Electrical West.
12:00 Announcements.
Adjournment.

Afternoon

2:00 Report of State Executive Committee.
2:30 Report of State Motor Section.
3:00 Report of Estimators Section.
3:30 Report of Merchandising Section.
4:00 General discussion.
Adjournment.

Evening

Informal dancing, music by Bill Hatch orchestra of Los Angeles.

Saturday, Oct. 15

Morning

"For a United Industry"

10:00 "A United Industry.—W. L. "Jack" Frost, general commercial manager, Southern California Edison Company, and president of the Pacific Coast Electrical Association.
10:20 "The Jobber's Position."—Harry L. Harper, manager Graybar Electric Company, Los Angeles, and president of the Pacific Division, Electrical Supply Jobbers Association.
10:40 "The Manufacturer's Position."—Speaker to be announced.

Development of Markets

11:00 "Air Heating for the Development of a Market."—C. B. Merrick, Wesix Electric Heater Company, Los Angeles.
11:20 "The Range Market."—Ray W. Turnbull, Pacific Coast sales manager, Edison Electric Appliance Company, San Francisco.
11:40 "Possibilities in Residence Ventilation."—Andy O'Rear, Pacific Coast manager, Ilg Electric Ventilating Company, Los Angeles.
12:00 "Relighting the Home."—G. H. P. Dellmann, lighting sales manager, San Diego Consolidated Gas & Electric Company, chairman of the Lighting Bureau, Commercial Section, P.C.E.A.

Noon

Annual four-inning baseball game between Electragist and Industry teams.
12:45 Joint dinner meeting between State Executive Committee and Pacific Coast switchboard manufacturers.

Afternoon

(Session for members only.)

2:00 Reports of the Secretaries.
3:00 General discussion of the application of Electragist principles to individual business.
4:00 Election of officers.

Evening

6:30 Annual banquet.
8:00 Dancing.

Ladies' Entertainment

While no definite announcement has been made regarding the special entertainment for women guests at the convention, a committee has been appointed to provide something original and unusual in this line. Details will be available at the convention headquarters.

"Through-the-Dealer" Plan Gets National Honors

The following resolution was passed at the recent convention of the A.E.I. at St. Louis:

WHEREAS, The present standards of living in the American homes have created a potential market for electrical labor-saving and comfort-giving appliances far in excess of the sales efforts of the electrical industry to supply it; and

WHEREAS, The electrical industry is seeking a successful sales plan which will take into consideration the united effort of all branches of the industry; and

WHEREAS, The San Joaquin Light & Power Company of Fresno, Calif., has created, through its years of successful merchandising practice, a plan for selling this potential market for electrical labor-saving and comfort-giving appliances, which has as its basic principle the united effort of the central station, the manufacturer, the jobber and the dealer, known as the "Through-the-Dealer Sales Plan;" and

WHEREAS, This plan has been thoroughly tested over a period of years and has been brought to this convention by the California Electragists as concrete proof that when the A.E.I. Trade Policy for distributing electrical merchandise from the manufacturer through the jobber to the dealer, and thence to the public, is intelligently applied, the results exceed anything previously secured, both from the standpoint of volume of load building sales and friendly trade relations. Therefore be it

RESOLVED, That this association, in convention assembled, indorses the "Through-the-Dealer" sales plan of merchandising electrical appliances for the homes; and be it further

RESOLVED, That the "Through-the-Dealer" sales plan be printed in pamphlet form and distributed to the electrical industry as our contribution to the successful solution of this tremendous residential market development.

Oregon Electragists Look to These Men for Leadership

President
C. A. VIBBERT
Vibbert & Todd,
Salem, Ore.

Vice-President
J. H. SROUFE
Jaggar-Sroufe Co.,
Portland

Secretary-Treasurer
J. R. TOMLINSON
Tomlinson Electric,
Portland

E. L. KNIGHT
President, Portland
Assn. of Electragists.
Knight Electric.

R. C. KENNEY
Exec. Com. Dist. 1.
Mgr. NePage McKenny
Co., Portland

Hold Estimating Classes on Knob and Tube Wiring

A second series of estimating classes in northern California was conducted by Cy Geisbush, state manager, California Electragists, during the months of September and October. Knob and tube wiring of a typical small residence was taken as a basis for the estimating lession. Using the Electragists' system of estimating as a basis of comparison, an analysis of the typical job was made in comparison to bids offered on the job by members of the class present.

The theory of mark-up for profit and overhead was also gone into in detail. The classes in each case ended with a showing of the advantages to be gained from the development of the Red Seal Plan by electrical contractors.

Meetings were held practically every night between Sept. 12 and Oct. 4 in a number of cities, contractors from all surrounding towns being invited to attend the classes.

Meetings were held at San Luis Obispo, Watsonville, San Jose, Redwood City, Santa Rosa, San Rafael, Concord, Napa, Marysville, Corning, Dunsmuir, Sacramento, Stockton, Modesto, Fresno, Visalia and Bakersfield.

Fred Buzzell, of the **Buzzell Electric Works,** San Francisco, well known Electragist, and Mrs. Buzzell, returned recently from an extended trip to the East. Mr. Buzzell went East to attend a meeting of the **Rockwood Paper Pulley Stores, Inc.,** in Indianapols, whence he went to Detroit and Howell, Mich. Bebore returning home, he visited Chicago, New York and Maine, and returned through Canada, stopping at Seattle on the way back. Mr. Buzzell reports a very excellent convention at the Rockwood sales conference at Indianapolis.

F. J. Boyle, representative of the **Master Electrical Contractors Association** of Chicago, Ill., was a visitor to the Pacific Coast, following the convention of the Association of Electragists, International, in St. Louis recently. Mr. Boyle was a guest of the contractors associations in the leading cities which he visited.

New Denver Code.—Following one month during which opportunity has been presented the contractors of Denver to become familiar with the new provisions of the electrical code for that city, the ordinance empowering that code will go into effect Aug. 1. Copies have been available to contractors since July 1. For local distribution they were issued in loose-leaf form to facilitate changes as they become necessary. A number of copies were also put out in regular leaflet form for distribution other than local.

Lee Baltzelle, estimator for the **J. J. Farley Electric Company** of Fullerton, Calif., was the delegate to the annual convention of the A.E.I. at St. Louis recently from the Estimators Section of the California Electragists, Southern Division. While in the East Mr. Baltzelle extended his trip to visit all the leading manufacturers of electrical equipment in order to familiarize himself with their methods and with the new equipment which they plan to bring out in order to take home authoritative information to the Estimators Section.

WHAT'S WRONG WITH THIS PICTURE?

Impressions of the California Electragists Convention at Riverside by One Who Has Never Been There.

Considering the fact that the artist has never attended an Electragist convention and has never seen most of those depicted so touchingly in the heart-rending little scene above, ELECTRICAL WEST offers a prize of ten back numbers to the one who successfully guesses the names of all those shown. The artist, having nothing to go by but the rosy reports of previous conventions and what happened at them, and a verbal description of our heroes, has sought to picture a recess between sessions pulled in one of the famous patios of Mission Inn, Riverside. Famous Electragists are these —can you identify them by their habits, haircuts or color of eyes. All entries must be mailed before the next convention in 1928. All contest fans will now step forward.

Personals

H. N. Beecher Heads California Electrical Inspectors

HARRY N. BEECHER, chief electrical inspector, City of Los Angeles, recently was elected president of the California Association of Electrical Inspectors. Mr. Beecher entered the electrical field in California in 1890 when he went to work for S. J. Keese, a well known electrical engineer of California. In 1896 he became associated with the Pasadena Lighting Company in charge of electrical distribution, and the following year joined the organization of the Long Beach Lighting Company.

In 1900 he was appointed deputy electrical inspector in the Department of Electricity, Los Angeles, under R. H. Manahan, who was then chief electrical inspector. A year later Mr. Manahan was promoted to the position of city electrician, and Mr. Beecher succeeded him as chief inspector, a position he has

HARRY N. BEECHER

since held. He is a member of the Electric and Synchronous Clubs of Los Angeles and of the Electrical Council of Underwriters Laboratories.

H. H. Courtright, president, Valley Electrical Supply Company, Fresno, Calif., recently returned to that city after a trip through the Middle West where he visited the merchandising departments of various central stations.

E. D. Treanor has been appointed managing engineer of the distribution transformer department at the Pittsfield, Mass., works of the General Electric Company. In that capacity Mr. Treanor also will have general supervision of the engineering on distribution transformers manufactured at the company's works in Fort Wayne, Ind., and Oakland, Calif.

W. C. Sterne, president and general manager, Summit County Power Company, Dillon, Colo., has been re-elected chairman of the electrical bureau, Denver Chamber of Commerce.

Henry E. Dewey, foreman of overhead construction, electric distributing department, Los Angeles Gas and Electric Corporation, recently retired after a service of thirty years with that company.

Harold T. White of White, Weld & Company, New York, has been elected chairman of the finance committee of The Washington Water Power Company, succeeding his father, the late W. A. White. **Henry L. De Forest** was made secretary of the committee. Mr. White recently visited the company's properties, including the new Chelan project.

Edward L. Garihan, formerly associated with the Chrome Steel Works and the Bethlehem Steel Company, has been appointed manager of the Mine & Smelter Supply Company, Denver branch. The company likewise has announced the appointment of **R. S. Rubincam** as sales manager.

Ralph U. Fitting, formerly associated with the firm of Parsons, Klapp, Brinckerhoff & Douglas, consulting engineers in New York, and for the last three years in the valuation department of the Pacific Gas and Electric Company, San Francisco, has been made valuation engineer for the Los Angeles Gas & Electric Corporation, Los Angeles.

F. L. Maytag, founder of **The Maytag Company,** Newton, Iowa, and chairman of its board, recently celebrated his seventieth birthday by distributing nearly $150,000 to the employees of his organization who have been with him three years and more.

Samuel Kahn, for the past year and a half vice-president and general manager of the Market Street Railway Company, San Francisco, and for a number of years prior to that vice-president and general manager of the Western States Gas & Electric Company, Stockton, Calif., has been elected president of the Market Street Railway Company.

E. R. Stauffacher, superintendent of protection, Southern California Edison Company, recently returned to Los Angeles after a six months' sojourn in the engineering department of the central-station division of the General Electric Company, Schenectady.

Leo G. Gianini, lighting specialist of the San Francisco office of the Edison Lamp Works of the General Electric Company, spoke on "The Use and Abuse of Window Lighting" at the recent annual convention of the Pacific Coast Association of Display Men held in San Francisco.

C. E. Heath, superintendent of transmission construction, Southern California Edison Company, Los Angeles, won the John B. Fisken Cup at the golf tournament held at the recent convention of the American Institute of Electrical Engineers at Del Monte, Calif. Mr. Heath's low net score was 65.

J. A. Kahn, of the Capital Electric Company, Salt Lake City, recently returned to that city after an extended trip East.

R. M. Boykin is New President of Seattle Electric Club

RICHARD M. BOYKIN, manager of the central division of the Puget Sound Power & Light Company with headquarters in Seattle, is the new president of the Seattle Electric Club.

RICHARD M. BOYKIN

A resident of the Northwest for the past sixteen years, Mr. Boykin is very well known throughout that section and has been prominently identified with the activities of the electrical industry. He has taken a prominent part in the activities of the Northwest Electric Light and Power Association and has served it in various capacities. During the year 1924-25 he was president of the association and last year was chairman of its Public Relations Section. He also has been extremely active in the work of the local section of the A.I.E.E. Mr. Boykin started his career in the electrical industry in the Northwest as owner and operator of the electrical system at Hillsboro, Ore. This system later was merged with the Washington-Oregon Corporation, which in turn became the North Coast Power Company, of which Mr. Boykin was made vice-president and general manager. When the North Coast company was absorbed by the Puget Sound Power & Light Company he was appointed manager of its southern district, a position which he held until the latter part of September, 1924, when he took over the management of the company's central division. The club membership is looking forward to a year of growth and prosperity under Mr. Boykin's guidance.

J. R. Cravath, consulting illuminating engineer, San Francisco, recently left that city to attend the national convention of the Illuminating Engineering Society to be held in Chicago, Oct. 11-14.

O. R. Doerr, formerly manager of electric heater department of the Magnavox Company, Oakland, has joined the organization of the Great Western Power Company, San Francisco, as assistant to **John Wrenn,** appliance sales manager.

Alfred Alsaker, chief engineer of the Delta-Star Electric Company, Chicago, sailed recently for a six weeks' visit to Norway, France and Italy to investigate high-tension developments.

C. A. Wolfrom Heads Utility's Salt Lake Division

CARL A. WOLFROM, since July, 1924, manager of the Provo division of the Utah Power & Light Company, has been named manager of that company's Salt Lake division, succeeding the late A. P. Merrill.

Mr. Wolfrom first became associated with the light and power industry in 1902 when he entered the employ of the Telluride Power Company. From 1903 to 1905 he was operator and plant superintendent of the Provo and Olmsted plants, which at that time were owned and operated by the Telluride company. After a course in mechanical engineering at the University of Michigan and a period of reconnaissance survey work on various streams in California for the late L. L. Nunn, Mr. Wolfrom was made superintendent of the Telluride company's Grace plant, a position which he held from 1909 to 1913. When the consolidation, which resulted in the organization of the Utah Power & Light Company took place early in 1913, he was placed in charge of the company's Wheelon plant on Bear River and also of its distribution system in the Garland and Tremonton territory.

CARL A. WOLFROM

In 1914 he became assistant to the operating manager, with headquarters at the general offices in Salt Lake City. He held that position until the early part of 1918, when he was appointed manager of the Idaho Falls division where he remained until promoted to the position of manager of the Provo division.

C. E. Skinner, assistant director of engineering, and **W. Bradshaw,** of the supply engineering department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, were named as delegates to the International Electrotechnical Commission convention, held at Bellagio, on Lake Como, Italy, Sept. 4-24.

H. J. Gille, general sales manager of the Puget Sound Power & Light Company in Seattle, recently returned from a business trip which included Chicago, Boston, New York and other Eastern cities.

Paul O. Reyneau recently joined the organization of the Cutter Electrical & Manufacturing Company, Philadelphia, where he will devote the major portion of his time to developing applications for air circuit breakers in the utility field. Mr. Reyneau's first electrical work was done as an employee of the Telluride Power Company, Salt Lake City, and he spent four years in the West engaging in the operation and construction of plants and transmission lines.

E. W. Lange, formerly of the Columbia Electric Manufacturing Company, San Francisco, has severed his connection with that concern.

Obituary

F. C. Wight, Editor Engineering News-Record, Passes

FRANK C. WIGHT, editor of Engineering News-Record, who had served that journal and its predecessor, Engineering News, in an editorial capacity for twenty-one years, died at his home in Summit, N. J., Sept. 18. Mr. Wight had been ill for only a week with an infected throat, though his death shortly followed his return to his desk after a nervous breakdown, which occurred last June.

Mr. Wight was especially interested in hydroelectric development, and through his work on Engineering News-Record in connection with that development and through his visits to the West he was well known to the electrical industry in that section, more particularly perhaps to central-station men. When he made trips through the Northwest and the Pacific Coast he gave keen attention to inspecting and studying the larger hydroelectric development projects, such as the Kings River project of the San Joaquin Light & Power Corporation and the Big Creek project of the Southern California Edison Company.

He was an authority on reinforced concrete and was known for his studies of the effect of sea water on concrete and his writings on reinforced-concrete design and construction. He also had devoted much time and attention to studies of the Mississippi River flood problem and traffic control.

Mr. Wight was graduated from Cornell University with the degree of civil engineer in 1904. After graduation he spent three years in the office of the engineer of bridges of the District of Columbia. His entry into technical journalism dated from December, 1906, when he became associate editor of Engineering News. In 1913 he was promoted to the managing editorship of that paper, a position which he held until the consolidation of Engineering News and Engineering Record in 1917. Four years later he became managing editor of Engineering News-Record, and on Jan. 1, 1924, he was made editor. At the time of his death he was president of the National Conference of Business Paper Editors and a former chairman of the New York Editorial Conference. He had been active for years in the work of both organizations.

FRANK C. WIGHT

A man of broad understanding and sympathies, the news of his untimely passing at the age of 45 will be learned with regret by all who knew him and his work.

Leo J. Meyberg, president of Leo J. Meyberg Company, San Francisco, died suddenly in that city Aug. 30. Mr. Meyberg was one of the pioneers of radio on the Pacific Coast, operating the first broadcasting station and entering the radio distributing field very early. Always active in the affairs of the Pacific Radio Trade Association, he was appointed chairman of its radio show committee last fall, and gave unsparingly of his time and energy in making the recent exposition a success. He died three days after its close.

John L. Phillips, Pacific Coast manager for the Okonite Company, Passaic, N. J., with headquarters in San Francisco, died of a heart attack in that city Sept. 6.

C. L. Johnson, an executive of the manufacturing department of the Western Electric Company, died Aug. 24 in Pittsfield, Mass., following an operation for appendicitis.

Everly L. Haines, for over twenty years an official of Curtis Lighting, Inc., Chicago, and secretary of that concern at the time of his death, died Aug. 30, at his home in Glencoe, Ill., after a long illness.

F. T. (Terry) Andrae, one of the original incorporators of Julius Andrae & Sons Company of Milwaukee, Wis., and widely known in the electrical industry in the Middle West and Northwest, died suddenly Aug. 12 of a heart attack.

George B. Thomas, of the engineering staff of the Bryant Electric Company, Bridgeport, Conn., died Sept. 8. Mr. Thomas, whose special work was in designing and improving methods of manufacture, had been connected with the company for more than twenty-five years.

Manufacturer & Distributor

Retail Sign Business on Coast Sold by Federal Company

The Federal Electric Company, Chicago, has discontinued its retail sign business in the Pacific Coast territory, which comprised the states of California, Washington, Oregon, Idaho, Utah, Nevada and Arizona, and has closed its sign factory at Emeryville, Calif., and its sign sales offices in San Francisco. The good will of the local retail sign business has been sold to the **Electrical Products Corporation,** which will handle the retail sign business from that source under its own name.

Major E. W. Moore, Western district manager for the Federal company, has removed his headquarters to the Los Angeles Warehouse Building, 316 Commercial Street, Los Angeles, and will continue to represent the Federal Electric Company in the Pacific Coast territory and to handle appliances and other articles manufactured or handled by it.

Carl E. Johnson, vice-president of the **U. S. Electrical Manufacturing Company,** Los Angeles, has resigned and disposed of his entire holdings in that company. Mr. Johnson has been an officer and director of the company since its inception and has been intimately identified with the electrical manufacturing industry in southern California for over twenty years.

Decorative plates for electric chandeliers now are requiring the full capacity of the **Spokane Pottery Company,** which opened its plant at Spokane, Wash., last April. Bases for electric table lamps also are produced there. The new industry, which is owned and operated by **S. Loenbom,** is located at Dishman, a suburb of Spokane.

Mangrum & Otter, San Francisco, have appointed **W. R. Adams,** formerly heavy-duty sales engineer with the Pacific Gas and Electric Company, as sales manager of their electrical department.

Lapp Insulator Company, Inc., Le Roy, N. Y., has established a New York City office at 149 Broadway, in charge of **Ralph L. Jenner,** recently with the transmission engineering department of the **Philadelphia Electric Company.**

The Miller Company, Meriden, Conn., has announced the recent election of **Michael Schwarz** as president of that company.

Fred S. Hunting, chairman of the board of directors, Robbins & Myers Company, Springfield, Ohio, and Mrs. Hunting, "snapped" on board the S.S. Maui as they left San Francisco recently en route to Honolulu.

The Presto-O-Lite Storage Battery Corporation, Indianapolis, Ind., recently has co-operated with its employees in the purchase of approximately $700,000 group life insurance as well as health and accident protection. The program covers more than 500 employees of the company, and the protection is based on annual salaries and ranges for individuals from $500 to $3,000 life insurance.

The Risdon Manufacturing Company, Waterbury Branch, is the new name of the **Novelty Manufacturing Company.** Offices are maintained at 200 Fifth Avenue, New York, and 53 W. Jackson Boulevard, Chicago.

Walter S. Sweet, manufacturers' agent, Los Angeles, representing the **Roach-Appleton Manufacturing Company,** Chicago, and **John I. Paulding, Inc.,** New Bedford, Mass., has removed to a new warehouse at 1426 Maple Avenue, Los Angeles.

The **Delta-Star Electric Company,** Chicago, has purchased the **Electric Connector Company** of Minneapolis, manufacturer of solderless rigid stud compression connectors. These connectors now will be made in the Chicago factory and the lines greatly extended.

E. L. Johnson, formerly with **H. B. Squires Company,** Seattle, has been transferred to the San Francisco office of the company. He has been replaced in Seattle by **A. A. Tufford** of San Francisco.

The Seattle offices of the **National Carbon Company** have been removed from the L. C. Smith Building to 2901 First Avenue, South. Harry J. Martin is Seattle representative.

Thor Line to Be Distributed by Thor Pacific Company

Announcement has been made by **The Electric Household Utilities Corporation,** Chicago, that the **Thor Pacific Company,** a new corporation, has been appointed exclusive distributor of Thor Washers, ironers and vacuum cleaners for the states of California, Nevada and Arizona.

The Thor Pacific Company has taken over the present factory organization and will maintain headquarters in Los Angeles at 1017 South Grand Avenue, with a branch in Oakland at 2421 Broadway. The Pacific Coast Division offices, formerly maintained by The Electric Household Utilities Corporation in the Rialto Building, San Francisco, have been discontinued. **The Pacific States Electric Company,** which has distributed the Thor line in the territory mentioned for the past fourteen years, will continue to warehouse the line in that territory and will cooperate in promoting its sale. **E. O. Thomas** and **T. W. Warner,** both of Pasadena, are president and vice-president, respectively, of the Thor Pacific Company.

The **Edison Electric Appliance Company** has purchased 22,500 sq.ft. of ground adjoining its plant in Ontario, Calif., and is planning to erect on it a new factory building at a cost of approximately $175,000, according to an announcement made recently by **Earl H. Richardson,** manager of the Hotpoint division of the company. With the completion of the projected addition, the Hotpoint factory in Ontario will cover more than three city blocks.

Lapp Insulator Company, Inc., Le Roy, N. Y., has announced the establishment of an office at 140 South Dearborn Street, Chicago. **Brent Mills** is in charge of this office, and a stock of insulators will be maintained for prompt service from Chicago.

The **Reiman Wholesale Electric Company,** Los Angeles, has appointed as its sales manager **Charles H. Talmadge,** formerly Salt Lake City manager for the **Graybar Electric Company.**

The **Cutler-Hammer Manufacturing Company,** Milwaukee, has announced that its Cleveland office has been removed from the Guardian Trust Building to the Guarantee Title Building, Suite 1905, in that city.

The Bryant Electric Company, Bridgeport, Conn., has announced the election of **Marcus A. Curran** as vice-president and general manager. Mr. Curran formerly was assistant to the vice-president of the **Graybar Electric Company.**

Electrical Products Corporation to Enlarge Plant

To provide for the rapidly growing business of the **Electrical Products Corporation** of Los Angeles, a deal was closed early in September for the purchase of a plot of ground, including improvements, immediately adjoining the company's present plant on Venice Boulevard, Los Angeles, according to a statement of **Paul D. Howse**, president. He further stated that a new plant would be opened in San Diego within the next two months.

The Los Angeles company is the principal subsidiary of the **Electrical Products Corporation of Arizona**, a holding company, which has exclusive license to manufacture and operate Neon electric-tube signs in the eleven Western states, holding its franchise from Claude Neon Lights, Inc., of New York. The company owns all the stock of operating subsidiaries incorporated in California, Washington and Oregon. These subsidiaries have plants at Los Angeles, Oakland, Fresno, Sacramento, Portland, Seattle, Salt Lake City and Denver.

Porcelain Products, Inc., is the name of a new corporation effected through the merger of **The Cincinnati Porcelain Company, General Porcelain Company, The Federal Porcelain Company, Ravenswood Porcelain Company, The Findlay Electric Porcelain Company** and **The National Electric Porcelain Company.** The general offices of the company will be at Findlay, Ohio, and the executive personnel of the former companies will continue active in the new organization. The officers of the new company are: president—**J. E. Bicknell**; vice-president—**F. E. Owen**; secretary and treasurer—**John G. Loy**; sales manager—**Jos. V. Patterson**; production manager—**H. A. Eatherton. Allied Industries, Inc.**, and **Maydwell & Hartzell, Inc.**, will represent the new company on the Pacific Coast.

Officer personnel of the **Illinois Electric Company**, Los Angeles, has been announced as follows: president—**Floyd M. Averill**; vice-president—**R. J. Holterman**; vice-president and general manager—**Burrell S. Manuel**; treasurer—**C. B. Hall**; secretary—**S. W. Murray. David Pence** has been appointed sales manager. Announcement of the change in ownership of the company was published in Electrical West Sept. 1, p. 184.

The **Falk Corporation**, Milwaukee, announces the opening of an office in Portland, Ore., at 720 Terminal Sales Building, Twelfth and Morrision Streets. This office will be in charge of **John Jurgensen**, who has been in the company's New York office for seven years.

The **Lincoln Electric Company**, Cleveland, has announced that **The Wade Engineering Company** of Los Angeles, its California distributor, has removed its northern office from 69 Webster Street, Oakland, to 533-539 Market Streeet, San Francisco.

The **United Electric Supply Company**, Salt Lake City, has moved into new quarters at West Temple and Fourth South Streets.

The **United States Steel Products Company** has removed its offices from the Rialto Building to the fourteenth floor of the Russ Building in San Francisco.

George A. Kilpatrick, for the past nine years storekeeper for the **Maytag Company**, Newton, Iowa, has joined the sales force of the **Maytag Pacific Company** in Portland, Ore.

The **Silvray Company, Inc.**, 55 West 16th Street, New York City, has appointed the **Silverlite Company**, 150 Post Street, San Francisco, as its distributor in the California territory.

Sam B. Gregory of the **Arrow Electric Company**, San Francisco, recently returned to that city from a business trip East.

At a recent stockholders' meeting of the **Appleton Rubber Company**, Franklin, Mass., the following officers were elected: president—**H. O. Phillips**; treasurer and general manager—**J. E. Cameron**; secretary and assistant treasurer—**Paul O. Lawton**; factory manager—**Robert Cowen.**

Companies Formed to Handle G.E. Refrigerators

The Arch Electric Company, 181-A Broadway, Portland, is the name of a new company formed to handle the distribution of **General Electric Company** refrigerators in the Portland territory. All of Oregon, except the extreme eastern portion, and the southwestern counties of Washington, are included in the territory. **Arch W. Trabert**, formerly of the General Electric Company, and more recently an electrical contractor in Aberdeen, Wash., is the owner and manager of the new company.

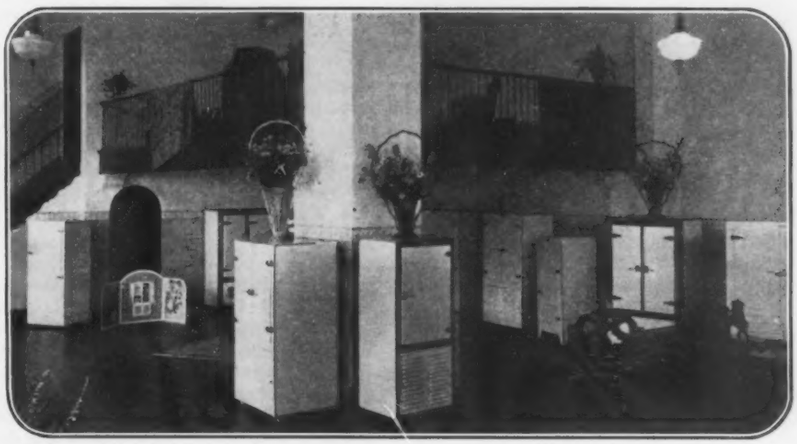
In Spokane distribution of General Electric refrigerators will be handled by the **Electric Refrigeration Company. Jerome L. Andrus**, formerly in the refrigeration business at Portland, is manager of the new Spokane company, which was financed by Spokane business men.

Atlantic-Pacific Agencies Corporation, formerly with headquarters at 383 Brannan Street, San Francisco, has removed to 835 Howard Streeet, with attractive offices, display and demonstration space, and warehouse facilities on the third floor of the building.

The **New Departure Manufacturing Company**, Bristol, Conn., has established a branch engineering office in San Francisco at 1812 Van Ness Avenue. **Elliott A. Allen** has been appointed resident manager.

Link-Belt Company, 910 South Michigan Avenue, Chicago, has announced that it is building a two-story factory at Toronto, Canada.

Frigidaire Corporation Opens Branch in Seattle

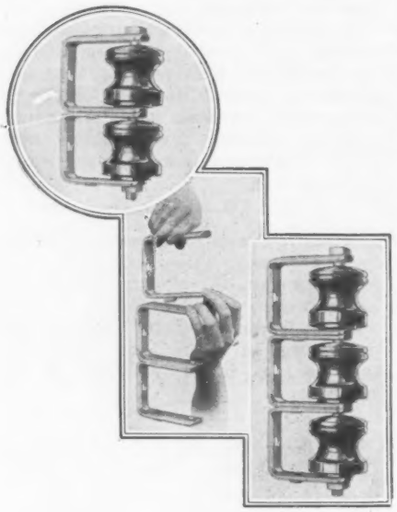


Carved furniture and Oriental rugs add greatly to the attractiveness of the branch sales office recently opened by the **Frigidaire Corporation** at 1901 Fourth Avenue, at the corner of Stewart Street. Spacious show windows fronting on the two streets give excellent opportunity for the display of Frigidaire cabinets, supplementing the display of all the models on the sales floor.

New Equipment

Universal Secondary Racks

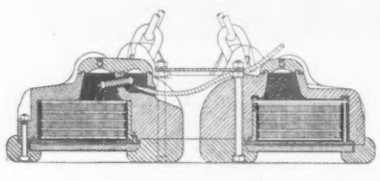
What is claimed to be the latest development in secondary rack construction and the first real universal rack is the Peirce **Universal secondary rack** recently placed on the market by **Hubbard & Company,** Pittsburgh, Pa.



The rack units are made alike and can be assembled to make any combination secondary racks with 4 or 8-in. spacings. These units are made of a single piece of steel and are roofed so that they will not injure the insulation of the line wire when pulled through the rack and also so that they will drain readily. The insulator bolt used is a standard ⅝-in. machine bolt, generally 2 in. longer than the over-all length of the rack, which can be readily determined as each unit is 4 in. over-all in height.

Lifting Magnets

The **new type SA lifting magnet** manufactured by **The Electric Controller & Manufacturing Company,** Cleveland, has these improvements, according to the company's announcement: Coil spider of composite construction with body of cast steel and flange of cold rolled brass, providing greater strength and better lifting capacity as compared with one-piece cast-brass spider. Outer pole shoe is extended upward to fit against a machined surface on the outside of the magnet housing, giving greater strength to prevent pole shoe breakage. A steel plate ½ in. thick is bolted in place at the top of the magnet to prevent injury to the incoming lead-wires from the crushing effect of the crane hook and chains.



Detailed description is furnished in Bulletin 900 which may be obtained from the company upon request.

Anchors

Two **new types of anchors** have been added to its line by the **W. N. Matthews Corporation,** St. Louis. One is the plate type of anchor known as Matthews Traplox (shown in the lower half of the illustration) and is made in three sizes, Nos. 90, 120 and 160, the numbers denoting the approximate area of the plate in square inches. The company states that this type of plate anchor is more satisfactory because all of the area is closed and the stress at the joint between rod and plate is evenly distributed around the ball and socket joint.

The other anchor is the expanding type known as Matthews Xpandix, which is made in two sizes, No. 8 Two-way, and No. 20 Five-way. An

8-in. hole is all that is needed for the No. 8 or No. 20. The No. 20 is the only five-way anchor made and expands out to 20 in. in diameter, the company states. Detailed description will be furnished upon request.

Push Button Switch Plates.—George Richards & Company, Inc., 557 West Monroe Street, Chicago, has placed on the market a line of molded push button switch plates, from one to four gangs. According to the manufacturer these plates, known as the Hemco molded push button wall plates, are designed to combine absolute safety with enduring beauty; they are molded of Bakelite and are absolutely shock-proof, and the rich satin finish is molded into the surface and is permanent and lasting.

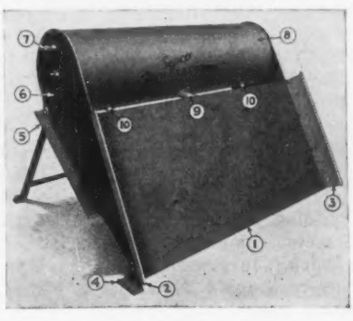
Color Hood Holder

A color hood holder to be used in connection with Reco color hoods is being placed on the market by the **Reynolds Electric Company,** 2650 West Congress Street, Chicago.

The company gives the following description of the device: "The holder in question is of non-corrosive metal and is made to be used in connection with both the screw and flush types of receptacles for three sizes of hoods, SF-14, AF-19 and AF-21. With the former type the hood holder is clamped to the face of the sign surface by means of the screw socket; with the flush type socket it is fastened to the surface with the two screws which hold the receptacle. The hood holder has a quarter-turn thread which securely holds the color hood in place. The advantages of this hood holder are that the lamp is protected from dust and dirt, which simplifies the matter of cleaning, and the white light is prevented from escaping through the end of the hood. Color hoods are furnished in six standard colors—ruby, green, canary, amber, blue and opal."

Storage Type Water Heater

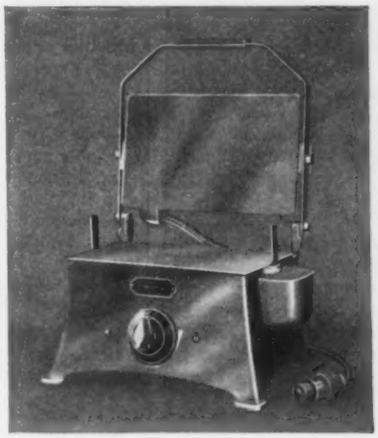
The "Sun-electric" **storage type water heater** manufactured under the Sepco trademark by the **Automatic Electric Heater Company,** 1505 Race Street, Philadelphia, has been announced by that company. This appliance will absorb the sun heat and furnish continuous hot water at any temperature, day or night, according to the announcement, and it will work anywhere, aboard a yacht or steamer, on the farm, on large or small apartment buildings, any place where the sun shines. On days of mellowed sunshine or when the sun fails a precision electric heating unit combined with special thermostatic control will replace the sun heat instantly and start furnishing at least 50 gal. of hot water which can be stored in a "thermos" type tank.



Sandwich Toaster

An **electric sandwich toaster** with a number of new features now is being manufactured by the **Westinghouse Electric & Manufacturing Company** at Mansfield, Ohio.

This toaster operates from the ordinary lighting circuit, using only 600 watts. Its adjustable top makes it suitable for either single slices of bread or thick sandwiches. It will toast a sandwich to a delicious brown in about two minutes, the company states, and the small size makes it



particularly desirable for counter use. The sandwich toaster is furnished with cord and plug and two-heat switch.

Floor-Polisher

The **Electric Vacuum Cleaner Company,** Cleveland, manufacturer of the Premier Duplex electric vacuum cleaner, recently announced the Premier Duplex **floor-polisher,** a new accessory for the cleaner.

This floor-polisher clamps readily on the base of the cleaner and is driven at a high rate of speed by means of a special belt from the armature shaft of the motor. According to its makers, its main advantages are its simplicity of construction, durability, ease of ap-

plication and ability to polish a wider strip of floor surface in a shorter length of time. The retail price is $10.

"Basebord" Heater

A small, compact **electric air heater** known as the "Basebord" is being offered by **The Electrical Heating & Manufacturing Company,** Seattle.

This heater fits right against the baseboard of the room, leaving just enough space behind for proper circulation of the air, or it may be used anywhere in the room. The "Basebord," which operates from the 110-120-volt circuit commonly used for lighting purposes, is made in two capacities, 660 watt and 1,200 watt. Both heaters have the same outside measurements, 7 in. high, 4 in. deep and 20 in. long. They are finished in nickel plate and gray enamel and the reflector is plated with 24-carat gold which cannot tarnish. The 660-watt heater retails for $16 and the 1,200-watt for $22.

The Pacific Electric Manufacturing Company, San Francisco, has placed on the market its Type OA **instrument current transformer.** These transformers originally were produced for installation within the tanks of the Pacific company's oil circuit breakers. Their successful operation under the severe conditions existing within the circuit breaker tanks has resulted in a demand for the transformer arranged for individual mounting and for installation other than within circuit breaker tanks, according to company announcement. These transformers have wound primaries and can be furnished with multiple ratio windings. Tap leads are brought out to the entrance bushing terminals so that the ratio may be varied without disturbing the mounting or oil tank. Bulletin No. 14 describing these transformers may be obtained from the company upon request.

A unit for the lighting of outdoor substations which provides illumination on vertical surfaces and eliminates dark shadows and dark pockets by the use of an extensive type of distribution curve has been announced by the **Holophone Glass Company, Inc.,** 342 Madison Avenue, New York.

In its announcement the company says: "The light is refracted upward so that the operator looks along with the light instead of into it, thereby effectively eliminating glare. Relamping is easy and safe. The construction of the Holophane refractor insures low dust collection. A special feature of the unit is its flexibility of light control. By loosening a locknut the entire unit may be rotated about its axis while burning, and the angle of maximum candlepower can be made to coincide with disconnect switches or other important apparatus.

Recent Publications

New Allen-Bradley Bulletins.—The following new bulletins have been issued by the **Allen-Bradley Company,** Milwaukee, Wis.: No. 410, "Types E-2100 and E-2200 Controlling Rheostats," with accompanying revised price list; No. 644, "Type H-2052 Semi-Automatic Resistance Starter;" No. 660, "Type H-1864 Slip-Ring Motor Starter;" No. 702, "Type J-1552 Alternating Current Contactor," with accompanying revised price list; No. 704, Type J-1552, Form R & RM Alternating Current Reversing Switch," with revised price list; No. 709, "Type J-1552, Form B Across-the-Line Starting Switch," with accompanying revised price lists; and No. 760, "Type J-3064 Automatic Slip-Ring Motor Starter," with revised price list.

High-Efficiency Centrifugal Pumps.—These pumps which, according to the company, have efficiencies of from 8 to 10 points higher than the average centrifugal pumps, are described in detail in Bulletin No. W613, issued by the **Worthington Pump & Machinery Corporation,** 115 Broadway, New York. The bulletin also tells how 10,000 pump inquiries were analyzed to determine the heads and capacities most commonly specified by pump users, this analysis being used as a basis by the company for designing new lines of high efficiencies, especially for those heads and capacities most commonly specified by users.

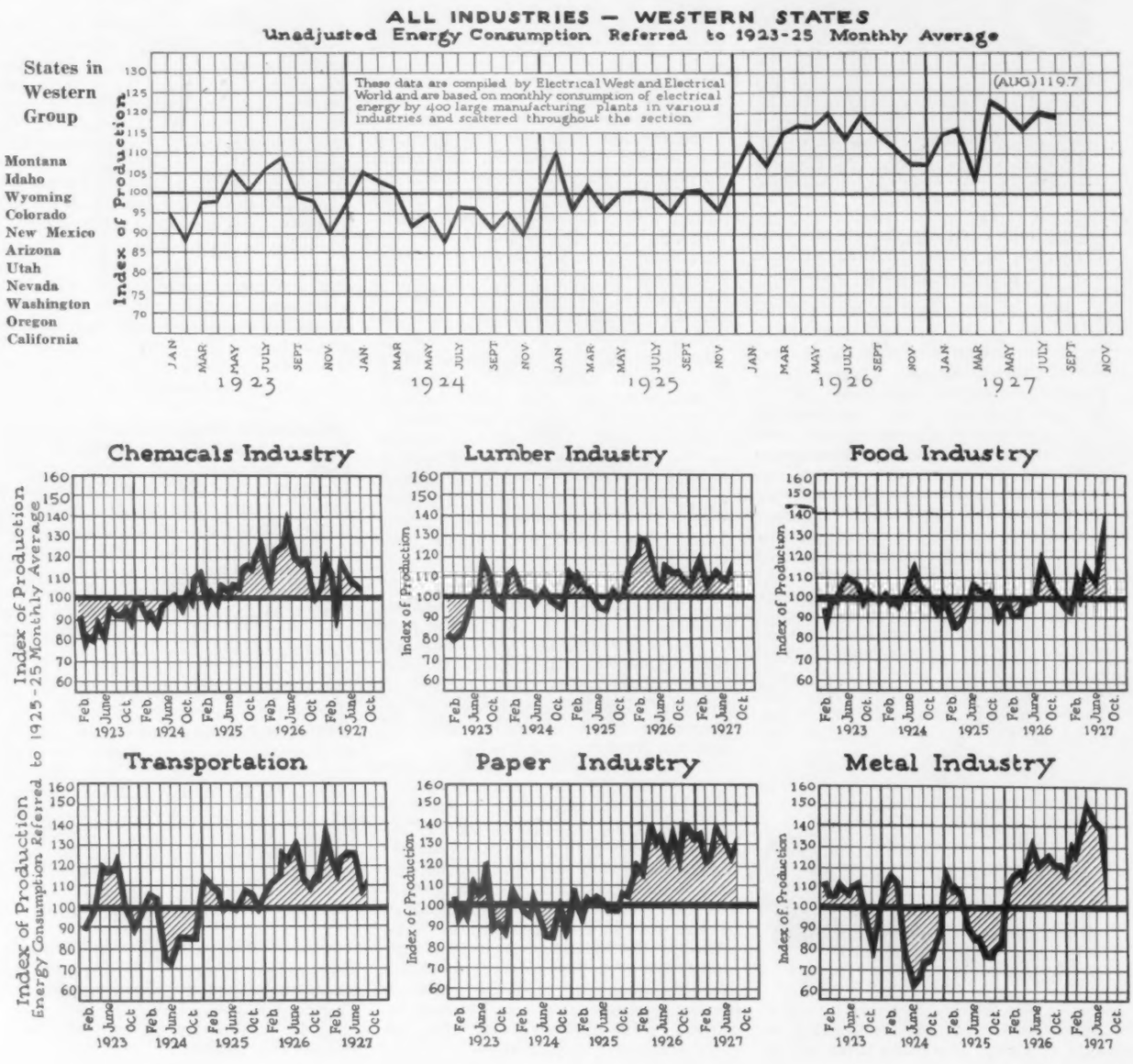
Chromalox Equipment.—Recent publications issued by the **Edwin L. Wiegand Company,** 422 First Avenue, Pittsburgh, include the following bulletins: C-106, Chromalox Heating Units; C-108, Chromalox Electric Heaters; C-109, Chromalox Heating Units for Domestic and Commercial Ranges, and Hotel and Restaurant Kitchen Equipment; and C-112, Chromalox Electric Water Heaters, Automatic and Non-Automatic, Side-Arm Type.

Electric Refrigeration.—Two pamphlets recently issued by the **National Refrigerating Company,** New Haven, Conn., setting forth the advantages of its electric refrigerator, the Ice-O-Lator, are entitled "Eletric Refrigeration" and "The Silent Servant for Your Home."

"Clark" Electrically Driven Tools.—This is the title given to Catalog No. 30, issued by the **James Clark, Jr., Electric Company,** Louisville, Ky., covering its electrically driven tools, generators and motors.

"Electrical West" Barometer of Industiral Activity in Western States

PRODUCTIVE activity in the manufacturing plants of the Western states during August as indicated by the monthly consumption of electrical energy was about 3.8 per cent under that witnessed during August last year, after corrections are made for the number of working days in the two months. The average daily production during August was about 8 per cent under that recorded during July of the current year. It appears that the manufacturing activities of the West are following very closely the record figures of 1926, the actual production of commodities during the first eight months of the year being within 1 per cent of that reported for the same period of 1926. There is every reason to believe that production during the remaining months of the year will be such as to result in a total production during 1927 on a par with that of the record year, 1926.

Practically all of the primary manufacturing industries of the Western states reported an increase in the actual production during August, but when corrections are made for the fact that August had two more working days than July it is found that only two industries—food and lumber—were operating at a higher rate than during July. The food industry appears to be operating at a rate 8 per cent over that of August last year. August activity in the lumber industry was 1.3 per cent under that of last year.

Industrial operations in the Western states are following very closely the general trends of industry in the nation as a whole. The national industrial activity during August as indicated by the consumption of electrical energy was about 0.3 per cent under that witnessed during August of last year. This is the first month since February that national general productive operations have been under those reported during 1926. The various sections of the nation, however, reported industrial conditions widely at variance with conditions in the nation as a whole. New England general productive activity during August was 5.3 per cent over that of last year and the southern states reported a 27 per cent increase. On the other hand, general industrial activity in the Middle Atlantic states was 6 per cent under August of last year, and the North Central states reported a 4 per cent decrease in operations. As indicated above, the Western states reported operations 3 per cent under last year.